

SONYJP-086

**TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371**

U.S. APPLICATION NO. (If known, see PCT Art. 15)

09/600003

INTERNATIONAL APPLICATION NO.  
PCT/JP99/06242INTERNATIONAL FILING DATES  
10 November 1999PRIORITY DATE CLAIMED  
12 November 1998TITLE OF INVENTION RECEIVING APPARATUS OF DIGITAL BROADCASTING AND DISPLAY  
METHOD OF RECORDING PROGRAM ASSOCIATED INFORMATIONAPPLICANT(S)  
FOR DO/EO/US Hajime INOUE, et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

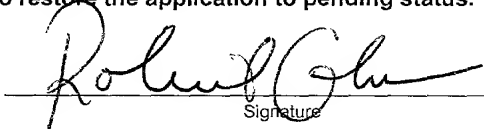
1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. 371 (f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371 (b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19<sup>th</sup> month from the earliest claimed.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c)(2))
  - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☒ has been transmitted by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371 (c)(2)) [w/ verification & Request]
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☒ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)). (**Executed**)
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

**Items 11. to 16. below concern document(s) or information included:**

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98. w/ PTO-1449, 6 references
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 & 3.31 is included.
13. ☒ A FIRST preliminary amendment.  
☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:

Thirteen (13) Sheets of Formal Drawings

**EXPRESS MAIL LABEL NO. EL458418794US****DATE: July 10, 2000**

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)		INTERNATIONAL APPLICATION NO.		ATTORNEY'S DOCKET NUMBER	
09/600003		PCT/JP99/06242		SONYJP-086	
17. <input checked="" type="checkbox"/> The following fees are submitted:				CALCULATIONS PTO USE ONLY	
<b>BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):</b>					
<input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO . . . . \$970.00					
<input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO . . \$840.00					
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<input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) . . . . . \$670.00					
<input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) . . . . . \$96.00					
<b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>				\$ 840.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).					
<b>CLAIMS*</b>		<b>NUMBER FILED</b>	<b>NUMBER EXTRA</b>	<b>RATE</b>	
Total claims		42 - 20 =	22	x \$18.00	\$396.00
Independent claims		12 - 3 =	9	x \$78.00	\$702.00
MULTIPLE DEPENDENT CLAIM(s) (if applicable)				+ \$260.00	
* As in Prelimin. Amendment - <b>TOTAL OF ABOVE CALCULATIONS =</b>				\$1,938.00	
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).					
<b>SUBTOTAL =</b>				\$1,938.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). +					
<b>TOTAL NATIONAL FEE =</b>				\$1,938.00	
Fee for recording the enclosed assignment (37 CFR 1.21 (h)). Assignment must be accompanied by appropriate cover sheet (37 CFR 3.28, 3.31) + (\$40.00 per property).					
<b>TOTAL FEES ENCLOSED =</b>				\$1,938.00	
				<b>Amount to be:</b>	
				<b>Refunded</b>	
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a. <input type="checkbox"/> A check in the amount of _____ to cover the above fees is enclosed.					
b. <input checked="" type="checkbox"/> Please charge my Deposit Account No. 12-1095 in the amount of \$1,938.00 to cover the above fees. A duplicate copy of this sheet is enclosed.					
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<b>NOTE: Where an appropriate time limit under 37 CFR 1.494 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.</b>					
SEND ALL CORRESPONDENCE TO:					
Lerner, David, Littenberg, Krumholz & Mentlik, LLP 600 South Avenue West Westfield, NJ 07090 Telephone 908 654-5000 Facsimile 908 654-7866					
				 Signature	
				ROBERT B. COHEN	
				Name	
				32,768	
				Registration Number	

09/600003  
534 Rec'd PCT/PTC 10 JUL 2000

PATENT  
SONYJP 3.3-086

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of  
Hajime INOUE *et al.*

International Application No.  
PCT/JP99/06242

International Filing Date:  
November 10, 1999

For: RECEIVING APPARATUS OF DIGITAL  
BROADCASTING AND DISPLAY  
METHOD OF RECORDING PROGRAM  
ASSOCIATED INFORMATION

Group Art Unit:

Examiner:

Date: July 10, 2000

Assistant Commissioner for Patents  
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Preliminary to initiation of the prosecution of the above-identified pending U.S. patent application, the following amendments and remarks are respectfully submitted.

IN THE CLAIMS

Please cancel claims 1-30 and substitute therefor the following new claims.

31. A receiving apparatus of a digital broadcasting for receiving a digital broadcasting signal constructed by a transport stream in which video data and audio data have been compressed and multiplexed, comprising:

a decoder for decoding said received digital broadcasting signal;

a digital interface for receiving the transport stream from a reproducing apparatus;

and

a display processing circuit for displaying information associated with a program recorded on a recording medium loaded in said reproducing apparatus by a predetermined format,

EXPRESS MAIL LABEL NO: EL458418794US

wherein in the case where the program is reproduced in said reproducing apparatus via said digital interface, said display processing circuit performs a display process so as to display a message showing that a recording mode of the program recorded on the recording medium loaded in said reproducing apparatus indicates a digital recording.

32. An apparatus according to claim 31, wherein said information associated with said program includes at least one of a channel number of the program, a program name, a genre, a date of the recording, and a recording time.

33. An apparatus according to claim 31, wherein said information associated with said program includes recording position information of the program on the recording medium.

34. An apparatus according to claim 31, wherein said information associated with said program is overlapped to a reproduction signal from said reproducing apparatus and displayed.

35. A display method of recording program associated information in a receiving apparatus of a digital broadcasting, comprising:

a step of receiving a digital broadcasting signal constructed by a transport stream in which video data and audio data have been compressed and multiplexed;

a step of decoding said received digital broadcasting signal;

a step of receiving the transport stream from a reproducing apparatus through a digital interface; and

a display processing step of displaying a message showing that a recording mode of a program recorded on a recording medium loaded in said reproducing apparatus indicates an analog recording or a digital recording.

36. A method according to claim 35, wherein said information associated with said program includes at least one of a channel number of the program, a program name, a genre, a date of the recording, and a recording time.

37. A method according to claim 35, wherein said information associated with said program includes recording position information of the program on the recording medium.

38. A method according to claim 35, wherein said information associated with said program is overlapped to a reproduction signal from said reproducing apparatus and displayed.

39. A method according to claim 35, wherein said information associated with said program includes information of the recording mode of said recorded program.

40. An apparatus according to claim 31, wherein said information associated with said program includes information of the recording mode of said recorded program.

41. A receiving apparatus of a digital broadcasting for receiving a digital broadcasting signal constructed by a transport stream in which video data and audio data have been compressed and multiplexed, comprising:

a decoder for decoding said received digital broadcasting signal;

a digital interface for receiving the transport stream from a reproducing apparatus;

and

a display processing circuit for displaying information associated with a program recorded on a recording medium loaded in said reproducing apparatus by a predetermined format, wherein in the case where the program is reproduced in said reproducing apparatus via an analog input/output, said display processing circuit performs a display process so as to display a message showing that a recording mode of the program recorded on the recording medium loaded in said reproducing apparatus indicates an analog recording.

42. An apparatus according to claim 41, wherein when the user selects a digital input/output, said display processing circuit performs a display process so as to display an alarm.

43. An apparatus according to claim 41, wherein said information associated with said program includes at least one of a channel number of the program, a program name, a genre, a date of the recording, and a recording time.

44. An apparatus according to claim 41, wherein said information associated with said program includes recording position information of the program on the recording medium.

45. An apparatus according to claim 41, wherein said information associated with said program is overlapped to a reproduction signal from said reproducing apparatus and displayed.

46. An apparatus according to claim 41, wherein said information associated with said program includes information of the recording mode of said recorded program.

47. A receiving apparatus of a digital broadcasting for receiving a digital broadcasting signal constructed by a transport stream in which video data and audio data have been compressed and multiplexed, comprising:

a decoder for decoding said received digital broadcasting signal;

a digital interface for receiving the transport stream from a reproducing apparatus;

reading means for reading out information associated with a program recorded on a recording medium loaded in said reproducing apparatus from a memory in said reproducing apparatus; and

a display processing circuit for displaying the information associated with the program recorded on the recording medium loaded in said reproducing apparatus by a predetermined format,

wherein said display processing circuit performs a display process so as to display the information associated with the program recorded on the recording medium loaded in said reproducing apparatus on the basis of the information read out by said reading means.

48. An apparatus according to claim 47, wherein said information associated with said program includes at least one of a channel number of the program, a program name, a genre, a date of the recording, and a recording time.

49. An apparatus according to claim 47, wherein said information associated with said program includes recording position information of the program on the recording medium.

50. An apparatus according to claim 47, wherein said information associated with said program is overlapped to a reproduction signal from said reproducing apparatus and displayed.

51. An apparatus according to claim 47, wherein said information associated with said program includes information of the recording mode of said recorded program.

52. A receiving apparatus of a digital broadcasting for receiving a digital broadcasting signal constructed by a transport stream in which video data and audio data have been compressed and multiplexed, comprising:

a decoder for decoding said received digital broadcasting signal;

a digital interface for receiving the transport stream from a reproducing apparatus;

reading means for reading out information associated with a program recorded on a recording medium loaded in said reproducing apparatus from a memory in said reproducing apparatus; and

a display processing circuit for displaying the information associated with the program recorded on the recording medium loaded in said reproducing apparatus by a predetermined format,

wherein in the case where a digital signal reproduced by said reproducing apparatus and received through interface means is not decoded in said decoder, said display processing circuit performs a display process so as to display a message showing that the program recorded on the recording medium loaded in said reproducing apparatus indicates a recording mode in which said digital signal cannot be decoded by said receiving apparatus of said digital broadcasting.

53. A receiving apparatus of a digital broadcasting for receiving a digital broadcasting signal constructed by a transport stream in which video data and audio data have been compressed and multiplexed, comprising:

a decoder for decoding said received digital broadcasting signal;

a digital interface for receiving the transport stream from a reproducing apparatus;

and

a display processing circuit for displaying a message showing that the recording mode of the program recorded on the recording medium loaded in said reproducing apparatus indicates an analog recording or a digital recording.

54. An apparatus according to claim 53, wherein said information associated with said program includes at least one of a channel number of the program, a program name, a genre, a date of the recording, and a recording time.

55. An apparatus according to claim 53, wherein said information associated with said program includes recording position information of the program on the recording medium.

56. An apparatus according to claim 53, wherein said information associated with said program is overlapped to a reproduction signal from said reproducing apparatus and displayed.

57. An apparatus according to claim 53, wherein said information associated with said program includes information of the recording mode of said recorded program.

58. A receiving apparatus of a digital broadcasting for receiving a digital broadcasting signal constructed by a transport stream in which video data and audio data have been compressed and multiplexed, comprising:

a decoder for decoding said received digital broadcasting signal;

a digital interface for receiving the transport stream from a reproducing apparatus;

and

a display processing circuit for displaying information based on a kind of a compression system of the program recorded on the recording medium loaded in said reproducing apparatus.

59. An apparatus according to claim 58, wherein said information associated with said program includes at least one of a channel number of the program, a program name, a genre, a date of the recording, and a recording time.



60. An apparatus according to claim 58, wherein said information associated with said program includes recording position information of the program on the recording medium.

61. An apparatus according to claim 58, wherein said information associated with said program is overlapped to a reproduction signal from said reproducing apparatus and displayed.

62. An apparatus according to claim 58, wherein said information associated with said program includes information of a recording mode of said recorded program.

63. A receiving apparatus of a digital broadcasting for receiving a digital broadcasting signal constructed by a transport stream in which video data and audio data have been compressed and multiplexed, comprising:

a decoder for decoding said received digital broadcasting signal;

a digital interface for receiving the transport stream from a reproducing apparatus;

and

a display processing circuit for displaying information based on a kind of the transport stream of the program recorded on the recording medium loaded in said reproducing apparatus.

64. An apparatus according to claim 63, wherein said information associated with said program includes at least one of a channel number of the program, a program name, a genre, a date of the recording, and a recording time.

65. An apparatus according to claim 63, wherein said information associated with said program includes recording position information of the program on the recording medium.

66. An apparatus according to claim 63, wherein said information associated with said program is overlapped to a reproduction signal from said reproducing apparatus and displayed.

67. An apparatus according to claim 63, wherein said information associated with said program includes information of a recording mode of said recorded program.

68. A display method of recording program associated information in a receiving apparatus of a digital broadcasting, comprising:

a step of receiving a digital broadcasting signal constructed by a transport stream in which video data and audio data have been compressed and multiplexed;

a step of decoding said received digital broadcasting signal;

a step of receiving the transport stream from a reproducing apparatus through a digital interface; and

a display processing step of displaying information associated with a program recorded on a recording medium loaded in said reproducing apparatus by a predetermined format,

wherein in said display processing step, when the program is reproduced in said reproducing apparatus through said digital interface, a display process is performed so as to display a message showing that a recording mode of the program recorded on the recording medium loaded in said reproducing apparatus indicates a digital recording.

69. A display method of recording program associated information in a receiving apparatus of a digital broadcasting, comprising:

a step of receiving a digital broadcasting signal constructed by a transport stream in which video data and audio data have been compressed and multiplexed;

a step of decoding said received digital broadcasting signal;

a step of receiving the transport stream from a reproducing apparatus through a digital interface; and

a display processing step of displaying information associated with a program recorded on a recording medium loaded in said reproducing apparatus by a predetermined format,

wherein in said display processing step, when the program is reproduced in said reproducing apparatus through an analog input/output, a display process is performed so as to display a message showing that a recording mode of the program recorded on the recording medium loaded in said reproducing apparatus indicates an analog recording.

70. A method according to claim 69, wherein in said display processing step, when the user selects a digital input/output, a display process is performed so as to display an alarm.

71. A display method of recording program associated information in a receiving apparatus of a digital broadcasting, comprising:

a step of receiving a digital broadcasting signal constructed by a transport stream in which video data and audio data have been compressed and multiplexed;

a step of decoding said received digital broadcasting signal;

a step of receiving the transport stream from a reproducing apparatus through a digital interface;

a reading step of reading out information associated with a program recorded on a recording medium loaded in said reproducing apparatus from a memory in said reproducing apparatus; and

a display processing step of displaying the information associated with the program recorded on the recording medium loaded in said reproducing apparatus by a predetermined format,

wherein in said display processing step, a display process is performed so as to display the information associated with the program recorded on the recording medium loaded in said reproducing apparatus on the basis of the information read out in said reading step.

72. A display method of recording program associated information in a receiving apparatus of a digital broadcasting, comprising:

a step of receiving a digital broadcasting signal constructed by a transport stream in which video data and audio data have been compressed and multiplexed;

a step of decoding said received digital broadcasting signal;

a step of receiving the transport stream from a reproducing apparatus through a digital interface;

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a reading step of reading out information associated with a program recorded on a recording medium loaded in said reproducing apparatus from a memory in said reproducing apparatus; and

a display processing step of displaying the information associated with the program recorded on the recording medium loaded in said reproducing apparatus by a predetermined format,

wherein in said display processing step, when a digital signal reproduced in said reproducing apparatus and received through a digital interface is not decoded in said decoding step, a display process is performed so as to display a message showing that the program recorded on the recording medium loaded in said reproducing apparatus indicates the recording mode in which the digital signal cannot be decoded.

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REMARKS

The above-noted cancellation of claims 1-30, and substitution of new claims 31-72, is respectfully submitted prior to initiation of the prosecution of this application in the U.S. Patent and Trademark Office. It is noted that during the International Phase of this application, applicant had filed an amendment pursuant to Article 19 of the Patent Cooperation Treaty. However, as no English translation of the Article 19 amendment has been supplied, it is understood that such Article 19 amendment has not been entered in this application. Thus, the present preliminary amendment uses claim numbers beginning with claim 31, the first number after the originally filed claims. The present preliminary amendment presents the same claims as present in the non-entered Article 19 amendment, except that the present preliminary amendment presents such claims in numerical order, in accordance with U.S. practice.

In view of the above, it is respectfully requested that this amendment now be entered, and that prosecution on the merits of this application now be initiated. If, however, for any reason the Examiner does not believe such action can be taken, it is respectfully requested that he telephone applicant's attorney at (908) 654-5000 in order to overcome any objections which he may have.

If there are any additional charges in connection with this requested amendment, the Examiner is authorized to charge applicant's Deposit Account No. 12-1095 therefor.

Respectfully submitted,

LERNER, DAVID, LITTENBERG,  
KRUMHOLZ & MENTLIK, LLP



ROBERT B. COHEN  
Reg. No. 32,768

600 South Avenue West  
Westfield, NJ 07090-1497  
Telephone: (908) 654-5000  
Facsimile: (908) 654-7866



PCT

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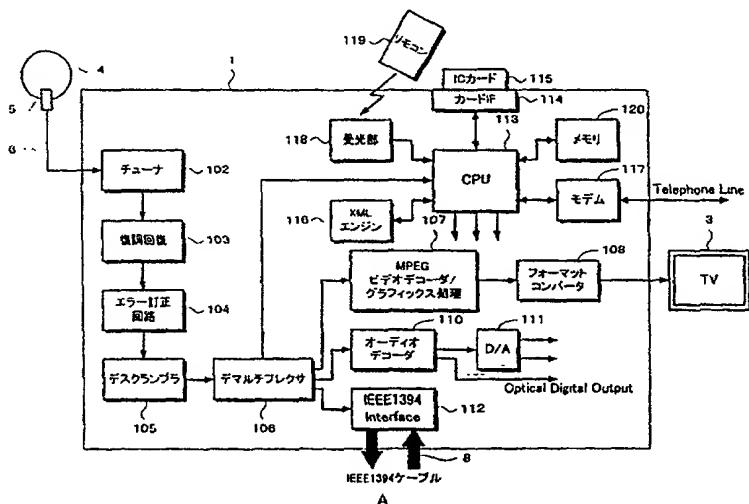
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(21) 国際出願番号 PCT/JP99/06242		(74) 代理人 弁理士 杉浦正知(SUGIURA, Masatomo) 〒170-0013 東京都豊島区東池袋1丁目48番10号 25山京ビル 420号 Tokyo, (JP)	
(22) 国際出願日 1999年11月10日(10.11.99)			
(30) 優先権データ 特願平10/322299 1998年11月12日(12.11.98) JP 特願平10/333255 1998年11月24日(24.11.98) JP		(81) 指定国 CN, JP, KR, US, 欧州特許 (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE)	
(71) 出願人 (米国を除くすべての指定国について) ソニー株式会社(SONY CORPORATION)[JP/JP] 〒141-0001 東京都品川区北品川6丁目7番35号 Tokyo, (JP)		添付公開書類 国際調査報告書 補正書	
(72) 発明者; および (75) 発明者/出願人 (米国についてのみ) 井上 肇(INOUE, Hajime)[JP/JP] 若原龍哉(WAKAHARA, Tatsuya)[JP/JP] 村山直樹(MURAYAMA, Naoki)[JP/JP] 水谷正男(MIZUTANI, Masao)[JP/JP] 〒141-0001 東京都品川区北品川6丁目7番35号 ソニー株式会社内 Tokyo, (JP) 太田安昭(OHTA, Yasuaki)[JP/JP] 〒491-0192 愛知県一宮市高田池尻6番地 ソニー一宮株式会社内 Aichi, (JP)			

(54) Title: **RECEIVER FOR DIGITAL BROADCAST AND METHOD FOR DISPLAYING INFORMATION CONCERNING RECORDED PROGRAM**

(54) 発明の名称 デジタル放送の受信装置及び記録プログラム関連情報の表示方法

# (57) Abstract

An apparatus capable of performing both analog recording/reproducing and digital recording/reproducing on/from the same video tape, which issues an alarm if a tape cassette containing a tape on which video is recorded in analog form is loaded to reproduce the video. Further the apparatus issues an alarm if a tape cassette containing a tape on which transport streams of different specifications or digital signals of a recording method other than the MPEG2 method are recorded is loaded to reproduce them. The apparatus reads information about the recording method of the program which the user wants to view referring to the smart file image. If the program to be reproduced is recorded in digital form, the apparatus changes its input to the digital video input; and if the program is recorded in analog form, the apparatus changes its input to the analog video input.



- |                                  |  |
|----------------------------------|--|
| 102 ... TUNER                    | 118 ... PHOTODETECTOR                          |
| 103 ... DEMODULATION CIRCUIT     | 116 ... XML ENGINE                             |
| 104 ... ERROR CORRECTING CIRCUIT | 120 ... MEMORY                                 |
| 105 ... DESCRAMBLER              | 117 ... MODEM                                  |
| 106 ... DEMULTIPLEXER            | 107 ... MPEG VIDEO DECODER/GRAPHICS PROCESSING |
| 119 ... REMOTE CONTROLLER        | 108 ... FORMAT CONVERTER                       |
| 115 ... IC CARD                  | 110 ... AUDIO DECODER                          |

534 Rec'd PCT/PTC 10 JUL 2000

## DESCRIPTION

Receiving apparatus of digital broadcasting  
and display method of recording program  
associated information

## 5 Technical Field

The invention relates to a program receiving  
apparatus, for example, a receiving apparatus of a  
digital broadcasting in a digital broadcasting system  
and to a display method of recording program associated  
information.

## Background Art

In recent years, IEEE1394 has started to  
spread as an interface for transferring video data or  
audio data between digital video apparatuses or between  
digital audio apparatuses at a high speed. According  
to IEEE1394, an isochronous transfer mode and an  
asynchronous transfer mode are supported. In the  
isochronous transfer mode, a delay time of transmission  
is guaranteed and it is suitable when it is used to  
transfer a data stream such as video data or audio data  
which is continuous with respect to time at a high  
speed. In the asynchronous transfer mode, it is  
guaranteed to certainly transmit data to a node on the  
partner destination side and it is suitable when it is  
used to certainly transfer data such as command,  
status, or the like.

In recent years, a digital satellite broadcasting has started to spread. In the digital satellite broadcasting, digital video data and audio data are compressed by an MPEG2 system and packetized to a predetermined format. A packet identifier called a PID is provided for a header of a transmission packet. Video packets and audio packets of a plurality of programs are multiplexed to a same stream and transmitted.

When such a digital satellite broadcasting is received, a decoder for receiving a digital satellite broadcasting called an IRD (Integrated Receiver Decoder) is connected to a television receiver. A signal of the digital satellite broadcasting received by a parabolic antenna is supplied to the IRD. A transport stream of MPEG2 is demodulated by the IRD. The video packet and audio packet of a desired program are extracted by the PID from the transport stream of MPEG2. A video signal and an audio signal are decoded from the video packet and audio packet. The video signal and audio signal are supplied from the IRD to the television receiver.

A method whereby the interface of IEEE1394 is provided for the IRD has been proposed in order to receive such a digital satellite broadcasting. If the interface of IEEE1394 is provided for the IRD, a receiving and recording/reproducing system of a digital



satellite broadcasting can be constructed by connecting the IRD to a digital apparatus such as a digital video recording/reproducing apparatus or the like. By constructing such a system, the transport stream of MPEG2 transmitted by the digital satellite broadcasting can be recorded/reproduced as it is.

That is, upon recording, the transport stream of MPEG2 received on the IRD side is sent to the digital video recording/reproducing apparatus via the interface of IEEE1394. The transport stream of MPEG2 is recorded as it is to a tape cassette by the digital video recording/reproducing apparatus. Upon reproduction, the transport stream of MPEG2 is reproduced from the tape cassette. The reproduced transport stream of MPEG2 is sent to the IRD via the interface of IEEE1394. The MPEG stream is decoded by the IRD.

As a digital video cassette recording/reproducing apparatus in the receiving and recording/reproducing system of the digital satellite broadcasting such that the transport stream of MPEG2 transmitted by the digital satellite broadcasting is recorded/reproduced as it is, the use of an apparatus which can perform a digital recording and an analog recording of data to a similar tape cassette can be taken into consideration. In such a kind of digital video cassette recording/reproducing apparatus, the

transport stream of MPEG2 transmitted by the digital  
satellite broadcasting can be recorded/reproduced as it  
is to/from the tape cassette and the video signal can  
be recorded/reproduced to/from a similar tape cassette  
in an analogwise manner. Therefore, the existing video  
sources can be widely used.

In such a system, however, since the digital  
recording and the analog recording can be performed to  
one tape cassette, the user cannot discriminate whether  
a program which he wants to reproduce and monitor is  
the program which was digitally recorded or analog-  
recorded. There is a case where the user becomes  
confused.

Therefore, for example, in the case where the  
user loads the analog-recorded tape cassette into the  
digital video cassette recording/reproducing apparatus  
and reproduces it without knowing that the program has  
been analog-recorded, since the signal is transmitted  
as a digital signal between the digital video cassette  
recording/reproducing apparatus and the IRD via the  
interface of IEEE1394, the reproduction signal from the  
digital video cassette recording/reproducing apparatus  
is not sent to the IRD and a reproduction picture plane  
cannot be displayed by the television receiver via the  
IRD. In this case, although it is necessary to switch  
the inputs of the television receiver so that the  
output of the digital video cassette

recording/reproducing apparatus is directly sent to the television receiver, most of the users are not aware of it. Consequently, there is such a possibility that when the analog-recorded tape cassette is loaded, a picture plane is not displayed on the television receiver and the user becomes confused. Particularly, in the case where the digital signal of the transport stream and the analog video signal have been mixedly recorded in the same tape cassette, when the portion of the analog video signal is reproduced, it happens that the picture plane suddenly becomes unseen.

There are a plurality of satellites which provide services of the digital satellite broadcasting and the services of further more digital satellite broadcastings will be started in future. Although the services of the digital satellite broadcasting which are provided at present fundamentally use the transport stream of the MPEG2 system, a broadcasting signal differs or the detailed specifications differ like a digital HDTV signal of BS. Further, in the future digital satellite broadcasting services, it is considered that the specifications will be different. Therefore, there is such a possibility that a tape cassette in which a transport stream of different specifications has been recorded is loaded into the digital video recording/reproducing apparatus of the system. If the tape cassette in which the transport

stream of the different specifications has been recorded is loaded and reproduced, the reproduction signal cannot be decoded by the IRD and a reproduction picture plane cannot be displayed on the television receiver via the IRD. Therefore, there is such a possibility that the user becomes confused.

Further, a plurality of digital video apparatuses can be connected in accordance with IEEE1394. Among the digital video apparatuses, there is an apparatus of the system in which, for example, a digital video signal is compressed without using the MPEG2 system and recorded. Even in the case where the digital video signal of a system other than the MPEG2 system is inputted to the IRD, the input signal cannot be decoded in the IRD and a reproduction picture plane cannot be displayed on the television receiver via the IRD. Therefore, there is such a possibility that the user becomes confused.

It is, therefore, an object of the invention to provide a receiving apparatus of a digital broadcasting, in which when a tape cassette which was analog-recorded or digitally recorded, a tape cassette in which a digital video signal of a system other than the MPEG2 system has been recorded, or a tape cassette in which a television broadcasting signal of different specifications has been recorded is reproduced, it is possible to cope with such a reproduction without

making the user confused, and to provide a display method of recording program associated information for such an apparatus.

## 5 Disclosure of Invention

To solve the above problem, according to the invention, there is provided a receiving apparatus of a digital broadcasting for receiving a digital  
10 broadcasting signal constructed by a transport stream in which video data and audio data have been compressed and multiplexed, comprising: a decoder for decoding the received digital broadcasting signal; an interface for receiving the transport stream from a reproducing  
15 apparatus; and a display processing circuit for displaying program associated information recorded on a recording medium loaded in the reproducing apparatus by a predetermined format.

## Brief Description of Drawings

20 Fig. 1 is a block diagram of an example of a receiving and recording/reproducing system of a digital satellite broadcasting to which the invention is applied; Fig. 2 is a block diagram of an example of an IRD in the receiving and recording/reproducing system  
25 of the digital satellite broadcasting to which the invention is applied; Fig. 3 is a block diagram of an example of a digital video cassette

recording/reproducing apparatus in the receiving and  
recording/reproducing system of the digital satellite  
broadcasting to which the invention is applied; Figs.  
4A and 4B are schematic diagrams showing the relation  
between the operating mode of the digital video  
cassette recording/reproducing apparatus and the  
operation of the IRD; Fig. 5 is a schematic diagram  
showing an example of a control panel; Fig. 6 is a  
schematic diagram showing an example of an alarm  
display; Fig. 7 is a flowchart showing a writing  
processing procedure of program recording information;  
Fig. 8 is a schematic diagram showing a genre  
correspondence table; Fig. 9 is a flowchart showing an  
editing processing procedure of the program recording  
information; Fig. 10 is a schematic diagram showing a  
smart file picture plane; and Fig. 11 is a status  
transition diagram showing processing steps of the  
digital video cassette recording/reproducing apparatus.

## Best Mode for Carrying Out the Invention

According to the first embodiment, in the  
case where a tape cassette which cannot correctly be  
displayed via the IRD like an analog-recorded program  
is reproduced, an alarm display is performed, thereby  
enabling the user to properly switch video inputs.

According to the second embodiment, in case  
of reproducing a tape cassette, by displaying a

recording system, a recording time, program information, and the like of each program recorded in the tape cassette, whether a program which the user wants to reproduce and monitor has been analog-recorded or digitally recorded, which television broadcasting signal has been recorded, further, program contents, and the like can be discriminated, and further, the user is promoted to properly switch the video inputs in order to reproduce and monitor a desired program.

A construction of a system which is common to the first and second embodiments will be first explained in detail hereinbelow.

In Fig. 1, reference numeral 1 denotes an IRD; 2 a digital video cassette recording/reproducing apparatus; and 3 a television receiver. A receiving and recording/reproducing system of a digital satellite broadcasting is constructed by the IRD 1, digital video cassette recording/reproducing apparatus 2; and television receiver 3. Each of the IRD 1 and digital video cassette recording/reproducing apparatus 2 has an interface of IEEE1394. The IRD 1 and digital video cassette recording/reproducing apparatus 2 are connected via a cable 8 of the interface of IEEE1394.

The IRD 1 decodes a reception signal of a digital satellite broadcasting and forms a video signal and an audio signal of, for example, the NTSC system. An antenna terminal of the IRD 1 is connected to a low

noise converter 5 attached to a parabolic antenna 4 via  
a cable 6. A radio wave from a satellite is  
transmitted by a band of, for example, 12 GHz. The  
radio wave from the satellite is received by the  
5 parabolic antenna 4 and converted into a signal of a  
band of, for example, 1 GHz by the low noise converter  
5 attached to the parabolic antenna 4.

An output of the low noise converter 5 is  
supplied to the antenna terminal of the IRD 1 via the  
10 cable 6. In the IRD 1, a signal of a desired carrier  
wave is selected from the reception signal and a  
transport stream of MPEG2 is demodulated. A video  
packet and an audio packet of a desired program are  
extracted from the transport stream. A decoding  
15 process of the video packet and audio packet is  
performed. For example, the video signal and audio  
signal of the NTSC system are decoded.

A video output terminal and an audio output  
terminal of the IRD 1 are connected to a video input  
20 terminal and an audio input terminal of the television  
receiver 3 via a cable 7. The video signal and audio  
signal decoded by the IRD 1 are supplied to the video  
input terminal and audio input terminal of the  
television receiver 3. A reception picture plane of a  
25 desired program is displayed on the television receiver  
3 and its audio sound is generated therefrom.

The digital video cassette



recording/reproducing apparatus 2 can perform a digital recording and an analog recording in the same tape cassette. The IRD 1 and digital video cassette recording/reproducing apparatus 2 are connected via the cable 8 of the interface of IEEE1394.

A video output terminal and an audio output terminal of the digital video cassette recording/reproducing apparatus 2 are connected to the video input terminal and an audio input terminal of the television receiver 3 via a cable 9. An antenna terminal of the digital video cassette recording/reproducing apparatus 2 is connected to a ground wave antenna 11 via a cable 10.

In this system, the transport stream of MPEG2 based on the reception output of the digital satellite broadcasting received by the IRD 1 can be recorded/reproduced by the digital video cassette recording/reproducing apparatus 2. The recording system at this time differs depending on the kind of IRD and either a single program system or a multiprogram system is used.

In the case where the IRD of the single program system is connected, a transport stream of one program is extracted by the IRD from a plurality of multiplexed transport streams. The extracted transport stream is transmitted to the digital video cassette recording/reproducing apparatus 2 via the interface of

IEEE1394 and recorded. In the case where the IRD of the multiprogram system is connected, a plurality of multiplexed transport streams are transmitted from the IRD to the digital video cassette recording/reproducing apparatus via the interface of IEEE1394 and recorded as they are. The digital video cassette recording/reproducing apparatus merely records the transport stream transmitted via the interface of IEEE1394 as it is. Processes upon recording at the time when the multiplexed transport streams are transmitted from the IRD of the multiprogram system and those at the time when one transport stream is transmitted from the IRD of the single program system are not very different.

The digital video cassette recording/reproducing apparatus 2 processes the signal of the ground wave broadcasting in an analogwise manner and can analog-record it to the loaded tape cassette.

In case of analog-processing the signal of the ground wave broadcasting and recording it to the tape cassette, the signal of the ground wave broadcasting is received by the antenna 11 and this reception signal is supplied to a ground wave tuner circuit in the digital video cassette recording/reproducing apparatus 2. By the ground wave tuner circuit, a signal of a desired channel is selected and an analog video signal and an analog audio

signal are demodulated from the reception signal. The analog video signal and analog audio signal are analog-recorded to the tape cassette loaded in the digital video cassette recording/reproducing apparatus 2.

5           In case of reproducing the video cassette in which the video signal and audio signal have been analog-recorded, this video cassette is loaded into the digital video cassette recording/reproducing apparatus 2 and reproduced. By the digital video cassette  
10 recording/reproducing apparatus 2, the reproduction signal is sent to the television receiver 3 via the cable 9, a reception picture plane based on the analog signal reproduced from the tape cassette is displayed on the television receiver 3, and its audio sound is  
15 generated therefrom. Similarly, the digital video cassette recording/reproducing apparatus 2 can also input an analog video signal and an analog audio signal from an analog apparatus such as an 8-mm VTR or the like and record them to the loaded tape cassette in an  
20 analogwise manner.

Fig. 2 shows a construction of the IRD 1. As shown in Fig. 1, the radio wave of the digital satellite broadcasting which is transmitted by the radio wave of a band of, for example, 12 GHz via a  
25 satellite is received by the parabolic antenna 4 and converted into the signal of a band of 1 GHz by the low noise converter 5 attached to the parabolic antenna 4.

An output of the low noise converter 5 is supplied to a tuner circuit 102 of the IRD 1 via the cable 6.

The tuner circuit 102 selects a signal of a predetermined carrier frequency from the reception  
5 signal on the basis of a control signal from a CPU (Central Processing Unit) 113 for controlling. A memory 120 is provided for the CPU 113. The selected signal of the carrier frequency is supplied to a demodulating circuit 103. For example, a QPSK  
10 (Quadrature Phase Shift Keying) demodulating process is executed in the demodulating circuit 103. The demodulated signal is supplied to an error correction processing circuit 104. A process such as Reed Solomon decoding or Viterbi decoding is performed in the error  
15 correction processing circuit 104.

An output of the error correction processing circuit 104 is supplied to a descrambler 105. Received ECM (Entitlement Control Message) data and EMM  
(Entitlement Management Message) data are inputted to  
20 the descrambler 105. Key data for descrambling stored in an IC card 115 loaded in an IC card slot 114 is also supplied to the descrambler 105. The descrambler 105 descrambles the MPEG transport stream by using the received ECM data and EMM data and the key data of the  
25 IC card 115. The descrambled transport stream of MPEG2 is sent to a demultiplexer 106.

The demultiplexer 106 separates a desired

packet from the stream from the descrambler 105 on the basis of a command from the CPU 113. In the transmission packet, a packet identifier (PID) is provided in a header portion. A video packet and an audio packet of the desired program are extracted by the demultiplexer 106 on the basis of the PID. The video packet of the desired program is sent to an MPEG2 video decoder 107 and the audio packet is sent to an MPEG audio decoder 110.

The MPEG2 video decoder 107 receives the packet of the video signal from the demultiplexer 106, performs a decoding process of the MPEG2 system, and forms video data. The video data is supplied to a format converter 108. In the format converter 108, a digital video signal which is outputted from the MPEG video decoder is converted into an analog video signal of, for example, the NTSC system.

An output of the format converter 108 is supplied to the television receiver 3 via an analog video output terminal (not shown).

The MPEG audio decoder 110 receives the audio packet from the demultiplexer 106, executes an audio decoding process of the MPEG system, and forms the audio data before the data compression. The decoded audio data is converted into the analog audio signal by a D/A converter 111 and, thereafter, the analog audio signal is supplied to the television receiver 3 via an

analog audio output terminal (not shown).

EPG data and XML data in the packet stream are separated by the demultiplexer 106 and sent to the CPU 113. An XML engine 116 is provided for the CPU 113.

An operation instruction for the IRD 1 is given by a remote controller 119. A remote control signal from the remote controller 119 is received by a photosensing unit 118 and supplied to the CPU 113. A modem 117 is provided and charging information is sent to a broadcasting station or a charging center by the modem 117 through a telephone line.

A carrier frequency of the reception signal is set on the basis of a channel setting signal inputted by a viewer. When setting to the desired program, a receiving frequency of the tuner circuit 102 is set to a predetermined carrier frequency by referring to an NIT (Network Information Table). The packet of the PID of a PMT (Program Map Table) as information regarding a desired channel is extracted with reference to a PAT (Program Association Table) as information regarding the channel at this carrier frequency. By referring to the PMT, PIDs of the packets of video, audio, and additional data of the desired channel are obtained.

An interface 112 of IEEE1394 is provided for the IRD 1. The transport stream can be

inputted/outputted between the demultiplexer 106 and the interface 112 of IEEE1394. In case of the IRD 1 corresponding to the single program system, the video packet and audio packet of the desired program are  
5 extracted by the demultiplexer 106. The transport stream of MPEG2 comprising the video packet and audio packet of the desired program is sent from the demultiplexer 106 toward the digital video cassette recording/reproducing apparatus 2 via the interface 112  
10 of IEEE1394. In case of the IRD 1 corresponding to the multiprogram system, a plurality of multiplexed transport streams which are sent by one carrier frequency are transmitted toward the digital video cassette recording/reproducing apparatus 2 via the  
15 interface 112 of IEEE1394.

In the case where the transport stream (single program) of MPEG2 reproduced by the digital video cassette recording/reproducing apparatus 2 is decoded by the IRD 1 corresponding to the single  
20 program system, the transport stream of MPEG2 from the digital video cassette recording/reproducing apparatus 2 is inputted via the interface 112 of IEEE1394 and sent to the demultiplexer 106. The video packet and audio packet are separated from the transport stream of  
25 MPEG2 by the demultiplexer 106. The video packet is sent to the MPEG2 video decoder 107 and decoded. The audio packet is sent to the MPEG audio decoder 110 and

decoded. A case where the transport stream  
(multiprogram) of MPEG2 reproduced by the digital video  
cassette recording/reproducing apparatus 2 is decoded  
by the IRD 1 corresponding to the single program system  
will be described hereinlater.

In the case where the transport stream  
(multiprogram) of MPEG2 reproduced by the digital video  
cassette recording/reproducing apparatus 2 is decoded  
by the IRD 1 corresponding to the multiprogram system,  
the transport stream of MPEG2 from the digital video  
cassette recording/reproducing apparatus 2 is inputted  
via the interface 112 of IEEE1394 and sent to the  
demultiplexer 106. The video packet and audio packet  
of the desired program are separated by the  
demultiplexer 106 on the basis of the control signal  
from the CPU 113. The video packet is sent to the  
MPEG2 video decoder 107 and decoded. The audio packet  
is sent to the MPEG audio decoder 110 and decoded.

In the case where the transport stream  
(single program) of MPEG2 reproduced by the digital  
video cassette recording/reproducing apparatus 2 is  
decoded by the IRD 1 corresponding to the multiprogram  
system, the transport stream of MPEG2 from the digital  
video cassette recording/reproducing apparatus 2 is  
inputted via the interface 112 of IEEE1394 and sent to  
the demultiplexer 106. The video packet and audio  
packet of the desired program are separated by the



demultiplexer 106. The video packet is sent to the MPEG2 video decoder 107 and decoded. The audio packet is sent to the MPEG audio decoder 110 and decoded.

Fig. 3 shows a construction of the digital video cassette recording/reproducing apparatus 2. The digital video cassette recording/reproducing apparatus 2 can perform the digital recording/reproduction and the analog recording/reproduction as mentioned above. A digital recording processing circuit 213 and a digital reproduction processing circuit 218 are provided in order to perform the digital recording/reproduction. An analog recording processing circuit 204 and an analog reproduction processing circuit 208 are provided in order to perform the analog recording/reproduction.

The whole control is performed by a CPU 224. An operation instruction for the digital video cassette recording/reproducing apparatus 2 is given by a remote controller 227. A remote control signal from the remote controller 227 is received by photosensing unit 226 and supplied to the CPU 224. A nonvolatile memory 225 is connected to the CPU 224.

In case of recording the transport stream from the IRD 1 (common to both single program system and multiprogram system), the transport stream of MPEG2 from the IRD 1 is inputted via an interface 223 of IEEE1394. The transport stream of MPEG2 is supplied to

the digital recording processing circuit 213. An error correction encoding process and a recording modulating process are performed to the data of the transport stream by the digital recording processing circuit 213.

5 An output of the digital recording processing circuit 213 is supplied to a head 214. Thus, the transport stream from the IRD 1 is recorded to a video tape 206 of the tape cassette loaded in the digital video cassette recording/reproducing apparatus 2.

10 In case of reproducing the tape cassette in which the transport stream (single program system) of MPEG2 has been recorded, a reproduction signal of the video tape 206 is reproduced by a head 217. An output of the head 217 is supplied to the digital reproduction processing circuit 218. A demodulating process and an error correcting process are executed by the digital reproduction processing circuit 218. An output of the digital reproduction processing circuit 218 is supplied to the interface 223 of IEEE1394. The reproduced transport stream is supplied to the IRD 1 via the cable 8 of IEEE1394.

20 A video packet and an audio packet are separated from the transport stream by the demultiplexer 106 (Fig. 2) of the IRD 1. The video packet is decompressed by the MPEG2 video decoder 107, converted into a video signal of the NTSC system by the format converter 108, and sent to the television

receiver 3 from a video output terminal (not shown).  
The audio packet is decompressed by the MPEG audio  
decoder 110, converted into an analog signal by the D/A  
converter 111, and sent to the television receiver 3  
from an audio output terminal (not shown). Processes  
in case of reproducing the tape cassette in which the  
transport stream (multiprogram system) of MPEG2 has  
been recorded will be described hereinlater.

In Fig. 3, in case of analog-recording the  
ground wave broadcasting, the signal received by the  
antenna 11 is supplied to a ground wave tuner circuit  
201. The reception signal of a desired broadcasting is  
selected by the ground wave tuner circuit 201. The  
analog video signal and audio signal of, for example,  
the NTSC system are demodulated from the reception  
signal. The analog video signal and analog audio  
signal are supplied to the analog recording processing  
circuit 204 via a switching circuit 203. A recording  
process of the video signal and audio signal is  
performed by the analog recording processing circuit  
204. That is, a luminance signal is frequency  
modulated, a chroma signal is converted into a low band  
frequency, and the audio signal is frequency modulated.  
Those signals are multiplexed and a resultant signal is  
supplied to a head 205. The analog video signal and  
audio signal are recorded by the head 205 onto the tape  
206 in the loaded tape cassette.

Further, an analog video signal and an analog audio signal supplied from an analog apparatus (for example, 8-mm VTR) connected to the outside can be analog-recorded. An analog video signal and an analog audio signal supplied from an analog external input terminal 215 are sent to the analog recording processing circuit 204 via the switching circuit 203. A recording process of the video signal and audio signal is performed by the analog recording processing circuit 204. The subsequent processes are substantially the same as those in case of analog-recording the ground wave broadcasting mentioned above.

In case of reproducing the analog-recorded tape cassette, the signal on the tape 206 is reproduced by a head 207 and supplied to the analog reproduction processing circuit 208. A reproducing process of the video signal and audio signal of the NTSC system is performed by the analog reproduction processing circuit 208. That is, a frequency modulation luminance signal, a low band conversion chroma signal, and a frequency modulation audio signal are extracted from a reproduction signal. A frequency demodulating process is performed to the frequency modulation luminance signal, so that the luminance signal is demodulated. The low band conversion chroma signal is returned to a chroma signal of a carrier frequency of 3.58 MHz. The video signal of the NTSC system is formed from the

luminance signal and the chroma signal. A frequency demodulating process is performed to the frequency modulation audio signal and the audio signal is demodulated. The video signal and audio signal are outputted from an analog output terminal 210.

The user can control various AV apparatuses connected to the IRD 1 via the interface of IEEE1394, for example, the digital video cassette recording/reproducing apparatus 2 by a control panel DISP2 (refer to Fig. 5) displayed on a monitor screen of the television receiver 3. For example, the cassette tape loaded in the digital video cassette recording/reproducing apparatus 2 can be reproduced by pressing a PLAY button on the control panel DISP2, and a desired program can be recorded onto the cassette tape by pressing a RECORD button.

The first embodiment will now be described.

In the system to which the invention is applied as mentioned above, the IRD 1 and digital video cassette recording/reproducing apparatus 2 are connected via the interface of IEEE1394. According to the interface of IEEE1394, the video data and audio data can be transmitted at a high speed in an isochronous transmitting mode and a command and a status signal are transmitted in an asynchronous transmitting mode. On the IRD 1 side, the operating status is set as shown in Figs. 4A and 4B on the basis

of the status signal sent from the digital video cassette recording/reproducing apparatus 2.

5 The operation in a status other than the reproduction will be first described. Fig. 4A shows the status other than the reproduction. As shown in Fig. 4A, in a status where an input/output is performed via IEEE1394 and when the control panel DISP2 (Fig. 5) is displayed, if the digital video cassette recording/reproducing apparatus 2 is in a stop mode, 10 the reception picture plane of the digital satellite broadcasting and its audio sound are generated and a station of the digital satellite broadcasting can be selected. When the digital video cassette recording/reproducing apparatus 2 is in a recording 15 pause mode, the reception picture plane of the digital satellite broadcasting and its audio sound are generated and a station of the digital satellite broadcasting can be selected. When the digital video cassette recording/reproducing apparatus 2 is in a 20 recording mode, the reception picture plane of the digital satellite broadcasting and its audio sound are generated. Since the recording operation is being performed at this time, a station of the digital satellite broadcasting cannot be selected and, at the 25 same time, a message of "During recording. Cannot be selected." is displayed.

When the control panel DISP2 is not

displayed, if the digital video cassette  
recording/reproducing apparatus 2 is in a stop mode,  
the reception picture plane of the digital satellite  
broadcasting and its audio sound are generated and a  
station of the digital satellite broadcasting can be  
selected. When the digital video cassette  
recording/reproducing apparatus 2 is in a recording  
pause mode, the reception picture plane of the digital  
satellite broadcasting and its audio sound are  
generated and a station of the digital satellite  
broadcasting can be selected. When the digital video  
cassette recording/reproducing apparatus 2 is in a  
recording mode, the reception picture plane of the  
digital satellite broadcasting and its audio sound are  
generated. Since the recording operation is being  
performed at this time, a station of the digital  
satellite broadcasting cannot be selected and, at the  
same time, an alarm message of "During recording.  
Cannot be selected." is displayed.

In a status where the input/output is  
performed in an analogwise manner, when the control  
panel DISP2 is displayed, if the digital video cassette  
recording/reproducing apparatus 2 is in a stop mode,  
the picture plane is muted as a gray screen and the  
audio sound is muted. As shown in Fig. 6, an alarm  
showing "During analog reproduction. Cannot be  
displayed." is displayed. At this time, a station of

the digital satellite broadcasting cannot be selected. When the digital video cassette recording/reproducing apparatus 2 is in a recording pause mode, the picture plane is muted as a gray screen and the audio sound is muted. As shown in Fig. 6, an alarm DISP1 showing "During analog reproduction. Cannot be displayed." is displayed. At this time, a station of the digital satellite broadcasting cannot be selected. When the digital video cassette recording/reproducing apparatus 2 is in a recording mode, the picture plane is muted as a gray screen and the audio sound is muted. As shown in Fig. 6, an alarm DISP1 showing "During analog reproduction. Cannot be displayed." is displayed. At this time, a station of the digital satellite broadcasting cannot be selected.

When the control panel DISP2 is not displayed, if the digital video cassette recording/reproducing apparatus 2 is in a stop mode, the reception picture plane of the digital satellite broadcasting and its audio sound are generated and a station of the digital satellite broadcasting can be selected. When the digital video cassette recording/reproducing apparatus 2 is in a recording pause mode, the reception picture plane of the digital satellite broadcasting and its audio sound are generated and a station of the digital satellite broadcasting can be selected. When the digital video



cassette recording/reproducing apparatus 2 is in a recording mode, the reception picture plane of the digital satellite broadcasting and its audio sound are generated and a station of the digital satellite  
5 broadcasting can be selected.

As mentioned above, the reason why the picture plane and the audio sound are muted when the control panel DISP2 is displayed in a state where the process is performed in an analogwise manner is to  
10 prevent the operation of the control panel DISP2 by an erroneous recognition of the user.

That is, if the reception picture plane of the digital satellite broadcasting and the control panel DISP2 are simultaneously displayed, the apparatus  
15 can be set to the recording mode in order to record the displayed picture plane by the control panel DISP2. However, in the analog input, the transport stream of the digital satellite cannot be recorded. If the apparatus is set to the recording mode in an analog  
20 state by the control panel DISP2, the reception picture plane or the like of the ground wave tuner circuit 201 is analog-recorded. As mentioned above, if the reception picture plane of the digital satellite broadcasting and the control panel DISP2 are  
25 simultaneously displayed, there is such a possibility that the apparatus is set to the recording mode by the control panel DISP2 in order to record the reception

picture plane. In this instance, even if the apparatus is set to the recording mode, the reception picture plane of the digital satellite broadcasting cannot be recorded as expected by the user. To prevent such a recording due to the erroneous recognition of the user, in a state where the process is performed in an analogwise manner, the picture plane and the audio sound are muted when the control panel DISP2 is displayed.

On the other hand, when the control panel DISP2 is not displayed, the apparatus cannot be set to the recording mode by the control panel DISP2. Therefore, even if the reception picture plane of the digital satellite broadcasting is displayed, while the user watches the reception picture plane, he does not record the received broadcasting by the control panel DISP2. On the other hand, if the picture plane and the audio sound have been muted at this time, the user becomes confused because the reception picture plane cannot be seen. Therefore, even in case of the analog input/output, when the control panel DISP2 is not displayed, the reception picture plane of the digital broadcasting is displayed on the reception picture plane.

The reproducing mode will now be described. Fig. 4B shows the contents in the reproducing mode. In the reproducing mode, if the reproduction is digitally

performed, when the control panel DISP2 is displayed, the reproduction picture plane is displayed and the reproduction sound is outputted. At this time, a station cannot be selected. Even when the control panel DISP2 is not displayed, similarly, in the reproducing mode, the reproduction picture plane is displayed, the reproduction sound is generated, and a station cannot be selected.

When the reproduction is performed in an analogwise manner, the picture plane is muted as a gray screen and the audio sound is muted. As shown in Fig. 6, an alarm DISP1 showing "During analog reproduction. Cannot be displayed." is displayed. At this time, a station of the digital satellite broadcasting cannot be selected. Even when the control panel DISP2 is not displayed as well, similarly, the picture plane is muted as a gray screen and the audio sound is muted. As shown in Fig. 6, an alarm DISP1 showing "During analog reproduction. Cannot be displayed." is displayed. At this time, a station of the digital satellite broadcasting cannot be selected.

As mentioned above, in a status where the analog input/output is performed, when the control panel DISP2 is displayed, in the reproducing mode, the picture plane and the audio sound are muted and an alarm DISP1 showing "During analog reproduction. Cannot be displayed." is displayed. Since the signal

is digitally transmitted between the digital video  
cassette recording/reproducing apparatus 2 and IRD 1,  
if the analog-recorded tape cassette is loaded into the  
digital video cassette recording/reproducing apparatus  
5 2 and the analog reproduction is performed, the  
reproduction signal from the digital video cassette  
recording/reproducing apparatus 2 is not sent to the  
IRD 1 and the reproduction picture plane cannot be  
displayed on the reproduction picture plane of the  
10 television receiver 3 via the IRD 1. In such a case,  
the picture plane and the audio sound are muted and an  
alarm DISPl showing "During analog reproduction.  
Cannot be displayed." is displayed.

As mentioned above, if the analog-recorded  
15 tape cassette is loaded into the digital video cassette  
recording/reproducing apparatus 2 and the analog  
reproduction is performed, the alarm showing "During  
analog reproduction. Cannot be displayed." is  
displayed. Thus, the user can correctly recognize the  
20 causes by which the reproduction picture plane cannot  
be displayed. That is, the user can recognize that it  
is necessary to switch the channel to a channel (Video  
1, Video 2, etc.) which is being analog-reproduced in  
order to see the reproduction picture plane.

25 There is such a possibility that the analog-  
recorded tape cassette is loaded into the digital video  
cassette recording/reproducing apparatus 2 as mentioned

above. Further, there is a case where a transport stream of another digital satellite broadcasting service is reproduced or a case where a tape cassette in which the digital video signal has been recorded by a different system is reproduced. Therefore, in the case where the tape cassette in which the transport stream of another digital satellite broadcasting service has been recorded is reproduced or in the case where the transport stream of a different system is reproduced, an alarm showing "Different system. Cannot be displayed." can be displayed.

Although the case where the transport stream of MPEG2 from the IRD 1 is recorded/reproduced by the digital video cassette recording/reproducing apparatus 2 has been mentioned in the embodiment, the transport stream of MPEG2 from the IRD 1 can be also recorded/reproduced by a recording/reproducing apparatus such as DVD, CD-R, hard disk, or the like.

The second embodiment will now be described.

In the digital video cassette recording/reproducing apparatus 2, while the digital recording process by which the transport stream which is sent from the IRD 1 to the digital video cassette recording/reproducing apparatus 2 via the IEEE1394 cable 8 is recorded to the video tape or the analog recording process by which the analog video signal and audio signal which are sent from the IRD 1 to the

digital video cassette recording/reproducing apparatus  
2 via the analog external input terminal 215 is  
recorded to the video tape 206 is being executed, the  
CPU 113 of the IRD 1 makes a writing preparation for  
5 writing program recording information such as title,  
channel number, date and time, and the like of a  
recording program into a memory IC 228 as memory means  
adhered to a backbone portion of a video cassette.

In this case, a video stream is fetched from  
10 the interface 112 of IEEE1394 by the CPU 113 as program  
recording information forming means. An EPG (Electric  
Program Guide) stream comprising packets in which an  
EPG has been recorded in the video stream is  
temporarily held in the memory 120. From the memory  
15 120, program associated data serving as program  
associated information such as channel number, title,  
genre, name of the broadcasting service enterprise, and  
the like which need to be displayed in a smart file is  
extracted from the EPG stream.

In the case where the analog recording is  
20 performed by the operation of the remote controller 119  
of the user, "normal" or "3 times" is selected as a  
recording speed. In the case where the digital  
recording is performed, "digital" is selected. In this  
25 instance, the CPU 113 obtains recording system  
information which is expressed by "normal" or "3 times"  
that is generated when the program data has been

analog-recorded to the video tape 206 by the digital  
video cassette recording/reproducing apparatus 2 or is  
expressed by "digital" that is generated when the  
program data has been digitally recorded to the video  
5 tape 206 and recording conditions such as date and  
time, day of the week, recording time, and the like  
from the CPU 224 of the digital video cassette  
recording/reproducing apparatus 2 via the IEEE1394  
cable 8. Program recording information is formed in  
10 the memory 120 on the basis of the program associated  
data and recording conditions.

By the CPU 113, the program recording  
information is sent to the CPU 224 of the digital video  
cassette recording/reproducing apparatus 2 from the  
15 interface 112 of IEEE1394 by the asynchronous  
communicating system via the IEEE1394 cable 8 and the  
interface 223 of IEEE1394. The program recording  
information is transmitted to a data reading/writing  
unit 229 by the CPU 224 on the basis of recording  
20 control data.

The data reading/writing unit 229 has a coil  
antenna (not shown), generates a fluctuation magnetic  
field according to the program recording information  
through the coil antenna, and supplies it to a coil-  
25 shaped antenna wiring (not shown) adhered to the  
backbone of the video cassette, thereby enabling the  
program recording information to be written into the

memory IC 228 connected to the antenna wiring.

In the digital video cassette recording/reproducing apparatus 2, consequently, when the recording process to the video tape 206 is finished by the CPU 224 of the IRD 1, the program recording information regarding the recording program is promptly written into the memory IC 228 of the video cassette.

A writing processing procedure in a range from the timing when the program recording information has been transmitted to the digital video cassette recording/reproducing apparatus 2 to the timing when it is written into the memory IC 228 of the video cassette on the basis of the control of the CPU 113 of the IRD 1 will now be described with reference to a flowchart of Fig. 7. The CPU 113 starts the processes from a starting step RT1 and enters step SP1. In step SP1, the CPU 113 selects the program designated by the remote controller 119 and advances to next step SP2.

In step SP2, the CPU 113 extracts the program associated data such as channel number, title, genre, name of the broadcasting service enterprise, and the like which need to be displayed in the smart file from the EPG stream in the selected program data and enters next step SP3.

In step SP3, the CPU 113 discriminates whether the extracted program associated data is the information necessary for the smart file or not. If



NO, this means that the extracted program associated data is not the necessary information to be displayed in the smart file. At this time, since there is no need to write the program associated data into the memory IC 228, the CPU 113 advances to step SP9 and finishes the processes.

On the other hand, if YES in step SP3, this means that the extracted program associated data is the necessary information to be displayed in the smart file. At this time, the CPU 113 advances to next step SP4. In step SP4, the CPU 113 temporarily holds the program associated data into the memory 120 and advances to next step SP5.

In step SP5, the CPU 113 discriminates whether the recording process for the video tape 206 has been started or not. If NO, this means that the recording process for the video tape 206 is not started yet. At this time, the CPU 113 repeats the above discriminating process until the recording process is started.

On the other hand, if YES in step SP5, this means that the recording process for the video tape 206 has already been started. At this time, it is necessary to promptly make the writing preparation for recording the program recording information into the memory IC 228 at a point when the recording process for the video tape 206 is finished. Next step SP6 follows.

The name of the genre of the program associated data added to the program data sent from the broadcasting service enterprise via the communication satellite and the name of the genre to be displayed in the smart file in the digital video cassette recording/reproducing apparatus 2 do not always correspond to each other in a one-to-one relationship manner. For example, as shown in Fig. 8, when the name of the genre in the digital video cassette recording/reproducing apparatus 2 is "news", the name of the genre in the broadcasting enterprise is "news/report".

In step SP6, therefore, the CPU 113 discriminates whether it is necessary to change the name of the genre before the program recording information held in the memory 120 is recorded to the video tape 206 by the digital video cassette recording/reproducing apparatus 2 or not on the basis of a genre correspondence table (Fig. 8) stored in the memory 120.

If NO in step SP6, this means that the name of the genre in the broadcasting enterprise and the name of the genre at the time when it is displayed in the smart file by the digital video cassette recording/reproducing apparatus 2 accidentally coincide with each other and there is no need to convert the name of the genre. At this time, the CPU 113 advances

to step SP8.

On the other hand, if YES in step SP6, this means that the name of the genre in the broadcasting enterprise and the name of the genre in the digital video cassette recording/reproducing apparatus 2 do not correspond to each other in a one-to-one relationship manner, and it is necessary to convert the name of the genre when the data is recorded to the video tape 206. At this time, the CPU 113 advances to next step SP7.

In step SP7, the CPU 113 converts the name of the genre that is sent from the broadcasting enterprise into the name of the genre in the digital video cassette recording/reproducing apparatus 2 on the basis of the genre correspondence table. The recording system information of the recording mode of "normal" or "3 times" (analog recording) or "digital" (digital recording) designated by the user and the recording conditions comprising the date and time, the day of the week, the recording time, and the like are obtained from the CPU 224 of the digital video cassette recording/reproducing apparatus 2 via the IEEE1394 cable 8. After that, the program recording information is formed on the basis of the recording conditions and the program associated data whose genre was converted. Next step SP8 follows.

In step SP8, the CPU 113 transmits the recording control data for writing the program

recording information into the memory IC 228 and the  
program recording information to the CPU 224 of the  
digital video cassette recording/reproducing apparatus  
2 via the interface 112 of IEEE1394, IEEE1394 cable 8,  
5 and interface 223 of IEEE1394, thereby instructing the  
CPU 224 to write the program recording information into  
the memory IC 228. The writing processing procedure  
RT1 is finished in next step SP9.

Subsequently, an editing processing procedure  
10 in a range from the timing when the program recording  
information once written in the memory IC 228 is edited  
in accordance with a request of the user to the timing  
when it is written again in the memory IC 228 on the  
basis of the control of the CPU 113 of the IRD 1 will  
15 be described with reference to a flowchart of Fig. 9.  
The CPU 113 starts the processes from a starting step  
RT2 and advances to step SP11.

In step SP11, the CPU 113 controls the CPU  
224 of the digital video cassette recording/reproducing  
20 apparatus 2 in such a manner that the program recording  
information which has already been written as data to  
be displayed in the smart file is read out from the  
memory IC 228 by the data reading/writing unit 229.  
The CPU 113 receives it via the interface 223 of  
25 IEEE1394, IEEE1394 cable 8, and interface 112 of  
IEEE1394. Next step SP12 follows.

In step SP12, the CPU 113 discriminates

whether the name of the genre in the digital video  
cassette recording/reproducing apparatus 2 and the name  
of the genre in the broadcasting enterprise do not  
correspond to each other in a one-to-one relationship  
manner and it is necessary to reversely convert and  
once return the name of the genre in the digital video  
cassette recording/reproducing apparatus 2 into the  
name of the genre of the broadcasting service  
enterprise or not.

If NO, this means that the genre which needs  
to be reversely converted does not exist. In this  
instance, the CPU 113 advances to step SP14. If YES in  
step SP12, on the other hand, this means that the genre  
which needs to be reversely converted exists. In this  
instance, the CPU 113 advances to step SP13.

In step SP13, the CPU 113 reversely converts  
the name of the genre and sets the apparatus into a  
state where the program recording information can be  
edited. Next step SP14 follows. In step SP14, the CPU  
113 holds the program recording information in the  
editable state into the memory 120 and advances to next  
step SP15.

In step SP15, the CPU 113 discriminates  
whether an edition instructing command has been issued  
by the operation of the remote controller 119 of the  
user or not. If NO, this means that the edition  
instructing command is not issued. At this time, the

CPU 113 continuously waits until the edition  
instructing command is issued.

If YES in step SP15, this means that the  
edition instructing command has been issued. In this  
instance, the CPU 113 advances to step SP16 and  
executes an editing process such as a change of the  
title or the like on the basis of the operation of the  
remote controller 119 of the user. Next step SP17  
follows.

In step SP17, the CPU 113 discriminates  
whether the name of the genre in the program recording  
information whose editing process is over and which has  
been held in the memory 120 needs to be again converted  
into the name of the genre at the time of displaying it  
in the smart file or not. If NO, the CPU 113 advances  
to step SP19 without executing the converting process.

If YES in step SP17 on the other hand, the  
CPU 113 advances to next step SP18 and converts the  
name of the genre into the name adapted to be displayed  
in the smart file. Next step SP19 follows.

In step SP19, the CPU 113 transmits the  
recording control data for writing the program  
recording information whose editing process is over  
into the memory IC 228 and the program recording  
information whose editing process is over to the CPU  
224 of the digital video cassette recording/reproducing  
apparatus 2 through the interface 112 of IEEE1394, the

IEEE1394 cable 8, and the interface 223 of IEEE1394,  
thereby instructing the CPU 224 of the digital video  
cassette recording/reproducing apparatus 2 to write the  
edited program recording information. The writing  
5 processing procedure RT2 is finished in next step SP20.

The case where the program recording  
information written in the memory IC 228 is read out  
and displayed on the television receiver 3 by the  
foregoing procedure will now be described. When an  
10 instruction to display the program recording  
information of the video cassette loaded in the digital  
video cassette recording/reproducing apparatus 2 is  
issued by the user via the control panel DISP2 or the  
like (for example, a "Smart File" button in the control  
15 panel DISP2 is pressed), the CPU 113 of the IRD1 first  
allows the CPU 224 to read out the program recording  
information from the memory IC 228 via the  
reading/writing unit 229 and receives the read-out  
program recording information through the IEEE1394  
20 cable 8.

The CPU 113 of the IRD 1 transmits the  
program recording information to the MPEG2 video  
decoder 107 from the interface 112 of IEEE1394. The  
MPEG2 video decoder 107 forms smart file image data by  
25 performing a graphics process to the program recording  
information and transmits it to the format converter  
108.

The format converter 108 converts the smart file image data into the luminance signal and color difference signals of the NTSC system, converts them into analog signals, and forms a smart file image signal. This signal is displayed on the television receiver 3 as a smart file picture plane 50 as a program recording information display picture plane as shown in Fig. 10.

In the reproducing mode in which the video tape 206 on which the program data has been recorded is reproduced by the digital video cassette recording/reproducing apparatus 2, in the case where an instruction to display the program recording information of the video cassette loaded in the digital video cassette recording/reproducing apparatus 2 is issued by the user via the control panel DISP2 or the like, the smart file picture plane 50 read out from the memory IC 228 of the video cassette can be also overlaid to a reproduction video image and displayed on the television receiver 3.

The smart file picture plane 50 is constructed by four pages in total. A title "Feature program of SF movie" of a video cassette is displayed in a title display region 51 of 1/4 page which is displayed at present. In the case where the program data has been recorded by the analog system of the "normal" speed, a message indicating that a blank time



of 1 hour 30 minutes remains is displayed in a display region 52.

On the smart file picture plane 50, in a program information display region 53, "12/23 Tuesday" is displayed as a date and time and the day of the week, "CH700" is displayed as a channel number, "Jackalo" is displayed as a title, "Movie" is displayed as a genre, "Normal" of the analog system is displayed as a recording speed, and "1H30M (1 hour 30 minutes)" is displayed as a recording time.

In a program information display region 54, "12/23 Tuesday" is displayed as date and time and the day of the week, "CH700" is displayed as a channel number, "Face on" is displayed as a title, "Movie" is displayed as a genre, "3 times" of the analog system is displayed as a recording speed, and "1H30M" is displayed as a recording time.

In a program information display region 55, "12/23 Tuesday" is displayed as date and time and the day of the week, "CH700" is displayed as a channel number, "Deep impacts" is displayed as a title, "Movie" is displayed as a genre, "digital" of the digital system is displayed as a recording speed, and "1H30M" is displayed as a recording time.

On the smart file picture plane 50, a bar display 59 is performed at the lowest stage, and at which position in a range from the start to the end of

the video tape 206 the blank time portion 60 is located  
is displayed in a different color, thereby enabling the  
user to easily recognize the position of the blank time  
portion 60. When the program information display  
5 region 55 of "Deep impacts" is selected, the portion  
where the program of "Deep impacts" has been recorded  
is displayed in a different color so that it is  
possible to easily find at which position in the range  
from the start to the end of the video tape 206 such a  
10 recorded portion exists.

On the smart file picture plane 50, an  
information display region corresponding to the current  
position of the video tape 206 is displayed in a  
different color. For example, when the current  
15 position of the video tape 206 is located in the middle  
of the program of "Deep impacts", the program  
information display region 55 corresponding to "Deep  
impacts" is displayed in a different color. Thus, the  
user can easily recognize the current position of the  
20 video tape 206.

The smart file picture plane 50 can be also  
read out by the operation of the remote controller 119  
(Fig. 2) by the user during the reproduction of the  
program and displayed in a state where it has been  
25 overlaid onto the program video image on the television  
receiver 3. When a RETURN button 61 is selected, the  
picture plane 50 is returned to the program video image

which is being reproduced.

By referring to the smart file picture plane 50, the user can confirm the recording date and time of the program to be monitored from now on, the genre, the title name, the recording time, and the analog/digital recording system information at a glance.

In the case where the user refers to the smart file picture plane 50 and designates, for example, the program information display region 55 by the operation of the remote controller 119, the CPU 113 of the IRD 1 controls the digital video cassette recording/reproducing apparatus 2, searches the selected program "Deep impacts", and reproduces it from the head portion.

Subsequently, in the digital video cassette recording/reproducing apparatus 2, a processing step in which the program recording information that is displayed in the smart file when the program data is recorded onto the video tape 206 is written into the memory IC 228 of the video cassette and a processing step until the smart file picture plane 50 read out from the memory IC 228 of the video cassette is overlaid onto the reproduction video image and a resultant video image is displayed on the television receiver 3 when the video tape 206 is reproduced will now be described by using Fig. 11.

In the IRD 1, after the program data was

first received in step SP21, the program recording information to be displayed in the smart file is formed and transmitted to the digital video cassette recording/reproducing apparatus 2 via the IEEE1394 cable 8 in step SP22, and the transport stream is transmitted to the digital video cassette recording/reproducing apparatus 2 via the IEEE1394 cable 8 in step SP23.

In the digital video cassette recording/reproducing apparatus 2, in step SP24, the CPU 224 analyzes recording control data D in order to write the program recording information into the memory IC 228 of the video cassette, sends the program recording information to the data reading/writing unit 229, and makes the writing preparation. In step SP25, the digital recording processing circuit 213 performs an error correction encoding process to the transport stream and records the processed transport stream to the video tape 206. In the digital video cassette recording/reproducing apparatus 2, in step SP26, the CPU 224 writes the program recording information into the memory IC 228 of the video cassette.

Subsequently, in the digital video cassette recording/reproducing apparatus 2, in step SP27, the CPU 224 reads out the program recording information from the memory IC 228 of the video cassette and returns it to the IRD 1 via the IEEE1394 cable 8. In

step SP28, the video tape 206 is reproduced and the CPU 224 performs an error correction decoding process to the transport stream reproduced by the digital reproduction processing circuit 218 and sends the processed transport stream to the IRD 1 via the IEEE1394 cable 8.

Subsequently, in the IRD 1, in step SP29, the program recording information is sent to the MPEG2 video decoder 107 and a graphics process is performed to the program recording information, thereby forming the smart file image data, and an MPEG decoding process is performed to the reproduction transport stream, thereby reconstructing the reproduction video data. In step SP33, the smart file image data and the reproduction video data are synthesized. After that, in step SP34, the synthesized data is converted into the data of the NTSC system and the resultant smart file picture plane 50 in a state where it has been overlaid onto the reproduction video image is displayed on the television receiver 3. The processing routine is finished.

In the above construction, according to the digital video cassette recording/reproducing apparatus 2, while the program data selected on the basis of the control of the CPU 113 of the IRD 1 is being recorded to the video tape 206 via the digital video cassette recording/reproducing apparatus 2, the program

associated data necessary to be displayed in the smart  
file is extracted from the electric program guide  
stream by the CPU 113. At the same time, the recording  
system information which is expressed by "normal", "3  
times", or "digital" and the recording conditions  
comprising the date and time, the day of the week, the  
recording time, and the like are obtained from the CPU  
224 of the digital video cassette recording/reproducing  
apparatus 2. The program recording information is  
formed on the basis of the program associated data and  
the recording conditions and the writing preparation is  
made.

The digital video cassette  
recording/reproducing apparatus 2 transmits the program  
recording information to the CPU 224 of the digital  
video cassette recording/reproducing apparatus 2 via  
the IEEE1394 cable 8 on the basis of the control of the  
CPU 113 of the IRD 1. When the recording process for  
recording the program data to the video tape 206 is  
finished, the program recording information is  
automatically written into the memory IC 228 of the  
video cassette.

Subsequently, in the case where the video  
tape 206 on which the program data has been recorded is  
reproduced or in the case where the user selects a  
smart file mode from the control panel DISP2 as shown  
in the diagram, the digital video cassette

recording/reproducing apparatus 2 reads out the program recording information from the memory IC 228 of the video cassette on the basis of the control of the CPU 113 of the IRD 1, transmits it to the MPEG2 video decoder 107 of the IRD 1 via the IEEE1394 cable 8, and performs the graphics process. After that, the processed data is displayed as a smart file picture plane 50 onto the television receiver 3.

The user watches the smart file picture plane 50 displayed on the monitor and confirms the recording date and time of the program recorded on the video tape 206, the genre, the name of the title, the recording time, and the recording system information expressed by "normal", "3 times" (analog), or "digital" (digital).

According to the above construction, in the digital video cassette recording/reproducing apparatus 2, the program data is recorded to the video tape 206 and the program recording information of the program data is automatically recorded in the memory IC 228 of the video cassette. When the video tape 206 on which the program data has been recorded is reproduced, the program recording information is first read out from the memory IC 228 and the smart file picture plane 50 according to the program recording information is displayed on the television receiver 3. Thus, the user can easily confirm the recording date and time of the program recorded on the video tape 206, the genre, the

name of the title, the recording time, and the analog/digital recording system information.

Thus, the user recognizes the recording system information of the program to be monitored from now on by watching the smart file picture plane 50 and, if the program to be reproduced has been digitally recorded, the user switches the input to the digital video input of the television receiver 3 in which the reproduction data by the digital video cassette recording/reproducing apparatus 2 is inputted from the IEEE 1394 cable 8 via the IRD 1. If the program to be reproduced has been analog-recorded, the user switches the input to the analog video input of the television receiver 3 in which the analog reproduction signal by the digital video cassette recording/reproducing apparatus 2 is inputted. That is, the user retrieves or recognizes the program to be monitored from now on by watching the smart file picture plane 50 and can select the proper input switching before a desired program is reproduced and monitored.

According to the digital video cassette recording/reproducing apparatus 2, the program recording information which was automatically recorded in the memory IC 228 of the video cassette can be edited by the user. Therefore, not only the program recording information is recorded as it is in the memory IC 228 in a state where it has been added to the



program data but also it can be edited again to the desired contents of the user and recorded in the memory IC 228.

Further, according to the digital video cassette recording/reproducing apparatus 2, when the program recording information is automatically recorded in the memory IC 228 of the video cassette on the basis of the control of the CPU 113 of the IRD 1, the name of the genre is converted on the basis of the genre conversion table. Therefore, the function for directly receiving and transmitting Kanji (Chinese character) codes and converting them into Japanese or the like becomes unnecessary, and a circuit construction can be simplified by an amount corresponding to such an unnecessary function.

In the foregoing embodiments, the case where "digital" is displayed in the smart file as recording system information in the case where the data was digitally recorded has been described above. However, the invention is not limited to such a case but it is possible to use one of a construction in which "digital 1" and "digital 2" are recorded and displayed in the smart file in order to distinguish the broadcasting service enterprises, a construction in which "digital CS" and "digital BS" are recorded and displayed in the smart file in order to distinguish the kind of broadcasting data to be digitally recorded, and a

construction in which "MPEG2" and "digital HDTV" are recorded and displayed in the smart file in order to distinguish that the transport stream of which specifications has been recorded.

5           The case where the program data is recorded to the video tape 206 and the program recording information is recorded in the memory IC 228 of the video cassette has been mentioned in the foregoing embodiments. However, the invention is not limited to  
10   it but the program data can be recorded to the disk-shaped recording medium and the program recording information can be also recorded in the memory means such as a memory IC or the like adhered to an area other than the data recording region on the disk-shaped  
15   recording medium. Also in this case, effects similar to those in the foregoing embodiments can be obtained.

          The case where the program data is recorded to the video tape 206 and the program recording information is recorded in the memory IC 228 of the  
20   video cassette has been mentioned in the foregoing embodiments. However, the invention is not limited to this but it is also possible to use a construction in which the program data is recorded to the video tape 206, the program recording information is stored in the  
25   nonvolatile memory 225 or the like in the digital video cassette recording/reproducing apparatus 2 together with identification data ID of the video tape 206, and

in the case where the program recording information is read out and displayed, the ID is discriminated from the loaded video tape 206, the corresponding program recording information is read out, and it is transmitted to the IRD side via the IEEE1394 interface and displayed.

Although the case where the program recording information is recorded in the memory IC 228 of the video cassette in a contactless manner has been mentioned in the above embodiments, the invention is not limited to such a construction but the program recording information can be also recorded in a contact manner.

According to the first embodiment of the invention, in the case where the analog-recorded tape cassette is loaded into the digital video cassette recording/reproducing apparatus and analog-reproduced, the fact that the digital video cassette recording/reproducing apparatus is in the analog reproducing mode is notified to the IRD side. In the case where the digital video cassette recording/reproducing apparatus is in the analog reproducing mode, an alarm message of "During analog reproduction. Cannot be displayed." is displayed.

According to the invention, in the case where the tape cassette in which the transport stream of different specifications or the digital video signal of a system

other than the MPEG2 system has been recorded is loaded into the digital video cassette recording/reproducing apparatus 2 and reproduced, an alarm message of "Different system. Cannot be displayed." is displayed.

5 As mentioned above, when the tape cassette which cannot be correctly reproduced is reproduced, the alarm message is displayed on the reproduction picture plane. Therefore, the user can correctly recognize the causes by which the reproduction picture plane cannot be  
10 displayed, so that he can take a necessary countermeasure such as to select the proper input switching or the like.

According to the second embodiment of the invention, the user recognizes the recording system  
15 information of the program to be monitored by watching the smart file picture plane 50 and, if the program to be reproduced has been digitally recorded, he switches the input to the digital video input of the television receiver 3 in which the reproduction data by the  
20 digital video cassette recording/reproducing apparatus 2 is inputted from the IEEE1394 cable 8 via the IRD 1. If the program to be reproduced has been analog-recorded, he switches the input to the analog video input of the television receiver 3 in which the analog  
25 reproduction signal by the digital video cassette recording/reproducing apparatus 2 is inputted. That is, the user retrieves or recognizes the program to be

monitored from now on by watching the smart file picture plane 50 and can select the proper input switching before the desired program is reproduced and monitored.

5

#### Industrial Applicability

The invention is suitable when it is applied to the receiving apparatus in the digital broadcasting system in which the receiving apparatus of the digital satellite broadcasting and the digital video cassette recording/reproducing apparatus are connected by, for example, the interface of IEEE1394.

10

## CLAIMS

1. A receiving apparatus of a digital broadcasting for receiving a digital broadcasting signal constructed by a transport stream in which video data and audio data have been compressed and multiplexed, comprising:

a decoder for decoding said received digital broadcasting signal;

an interface for receiving the transport stream from a reproducing apparatus; and

a display processing circuit for displaying program associated information recorded on a recording medium loaded in said reproducing apparatus by a predetermined format.

2. An apparatus according to claim 1, wherein said program associated information recorded on the recording medium loaded in said reproducing apparatus is information based on a kind of said transport stream of said recorded program.

3. An apparatus according to claim 1, wherein said program associated information recorded on the recording medium loaded in said reproducing apparatus is information based on a kind of compression system of said recorded program.

4. An apparatus according to claim 1, wherein said program associated information recorded on the recording medium loaded in said reproducing apparatus

is information of a recording mode of said recorded program.

5. An apparatus according to claim 4, wherein said recording mode is an analog recording or a digital recording.

6. An apparatus according to claim 3, wherein said recording mode is a 3-times or normal recording mode in an analog recording mode.

7. An apparatus according to claim 1, wherein when the reproduction of the program is not performed in said reproducing apparatus through said interface but is performed through an analog input/output, said display processing circuit executes a display process so as to display a message indicating that a recording mode of the program recorded on the recording medium loaded in said reproducing apparatus is an analog recording.

8. An apparatus according to claim 7, wherein when the user selects a digital input/output, said display processing circuit executes a display process so as to display an alarm.

9. An apparatus according to claim 1, further comprising a control panel display processing circuit for displaying a control panel for controlling said reproducing apparatus, and wherein when said control panel is displayed, said control panel display processing circuit executes a display process so as to

display an alarm.

10. An apparatus according to claim 1, wherein when the reproduction of the program is executed in said reproducing apparatus through said interface, said display processing circuit executes a display process so as to display a message indicating that a recording mode of the program recorded on the recording medium loaded in said reproducing apparatus is a digital recording.

11. An apparatus according to claim 1, wherein when a digital signal reproduced in said reproducing apparatus and received through said interface is not decoded in said decoder, said display processing circuit executes a display process so as to display a message indicating that the program recorded on the recording medium loaded in said reproducing apparatus is a recording mode in which said digital signal cannot be decoded by said receiving apparatus of the digital broadcasting.

12. An apparatus according to claim 1, wherein said program associated information includes at least one of a channel number of the program, a program name, a genre, a recording day, and a recording time.

13. An apparatus according to claim 1, wherein said program associated information includes recording position information of the program on the recording medium.



14. An apparatus according to claim 1, wherein said program associated information is overlaid onto a reproduction signal from said reproducing apparatus and displayed.

5 15. An apparatus according to claim 1, further comprising reading means for reading out said program associated information recorded on the recording medium loaded in said reproducing apparatus from a memory in said reproducing apparatus, and wherein said display processing circuit performs a display process so as to display said program associated information recorded on the recording medium loaded in said reproducing apparatus on the basis of the information read out by said reading means.

10 16. A display method of recording program associated information in a receiving apparatus of a digital broadcasting, comprising:

15 a step of receiving a digital broadcasting signal constructed by a transport stream in which video data and audio data have been compressed and multiplexed;

20 a step of decoding said received digital broadcasting signal;

25 a step of receiving the transport stream from a reproducing apparatus through an interface; and

a display processing step of displaying program associated information recorded on a recording

medium loaded in said reproducing apparatus by a predetermined format.

17. A method according to claim 16, wherein said program associated information recorded on the recording medium loaded in said reproducing apparatus is information based on a kind of said transport stream of said recorded program.

18. A method according to claim 16, wherein said program associated information recorded on the recording medium loaded in said reproducing apparatus is information based on a kind of compression system of said recorded program.

19. A method according to claim 16, wherein said program associated information recorded on the recording medium loaded in said reproducing apparatus is information of a recording mode of said program.

20. A method according to claim 19, wherein said recording mode is an analog recording or a digital recording.

21. A method according to claim 19, wherein said recording mode is a 3-times or normal recording mode in an analog recording mode.

22. A method according to claim 16, wherein when the reproduction of the program is not performed in said reproducing apparatus through said interface but is performed through an analog input/output, in said display processing step, a display process is performed

so as to display a message indicating that a recording mode of the program recorded on the recording medium loaded in said reproducing apparatus is an analog recording.

5        23.        A method according to claim 22, wherein when the user selects a digital input/output, in said display processing step, a display process is performed so as to display an alarm.

10       24.        A method according to claim 16, further comprising a control panel display processing step of displaying a control panel for controlling said reproducing apparatus, and wherein when said control panel is displayed, a display process is performed so as to display an alarm.

15       25.        A method according to claim 16, wherein when the reproduction of the program is executed in said reproducing apparatus through said interface, in said display processing step, a display process is performed so as to display a message indicating that a recording mode of the program recorded on the recording medium loaded in said reproducing apparatus is a digital recording.

20       26.        A method according to claim 16, wherein when a digital signal reproduced in said reproducing apparatus and received through said interface is not decoded in said decoding step, in said display processing step, a display process is performed so as

25

to display a message indicating that the program recorded on the recording medium loaded in said reproducing apparatus is a recording mode in which said digital signal cannot be decoded by said receiving apparatus of the digital broadcasting.

27. A method according to claim 16, wherein said program associated information includes at least one of a channel number of the program, a program name, a genre, a recording day, and a recording time.

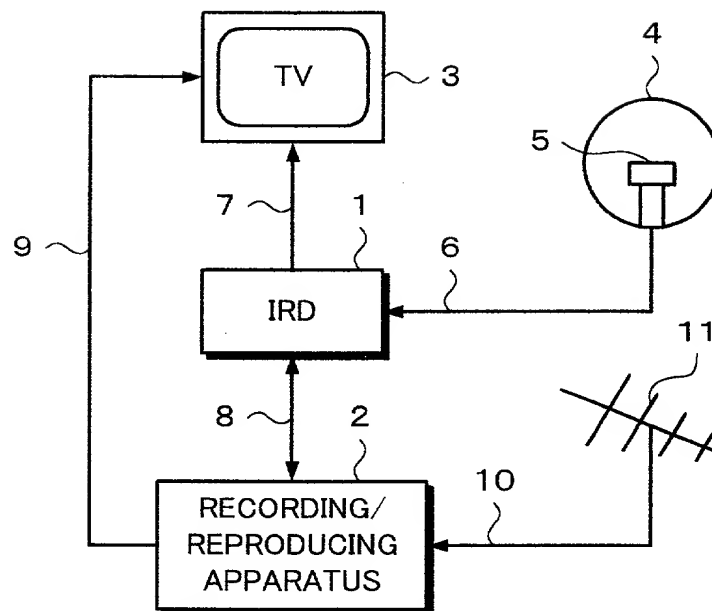
28. A method according to claim 16, wherein said program associated information includes recording position information of the program on the recording medium.

29. A method according to claim 15, wherein said program associated information is overlaid onto a reproduction signal from said reproducing apparatus and displayed.

30. A method according to claim 15, further comprising a reading step of reading out said program associated information recorded on the recording medium loaded in said reproducing apparatus from a memory in said reproducing apparatus, and wherein in said display processing step, a display process is performed so as to display said program associated information recorded on the recording medium loaded in said reproducing apparatus on the basis of the information read out by said reading step.

## ABSTRACT

When an analog-recorded tape cassette is loaded into an apparatus which can perform an analog recording/reproduction and a digital recording/reproduction by a same video tape and is reproduced, an alarm is displayed. When a tape cassette in which a transport stream of different specifications or a digital video signal of a system other than the MPEG2 system has been recorded is loaded into the apparatus and reproduced, an alarm is displayed. The user watches a smart file picture plane and recognizes recording system information of a program to be monitored from now on. If the program to be reproduced has been digitally recorded, the user switches the input to a digital video input. If the program to be reproduced has been analog-recorded, the user switches the input to an analog video input.

**Fig. 1**

**Fig. 2**

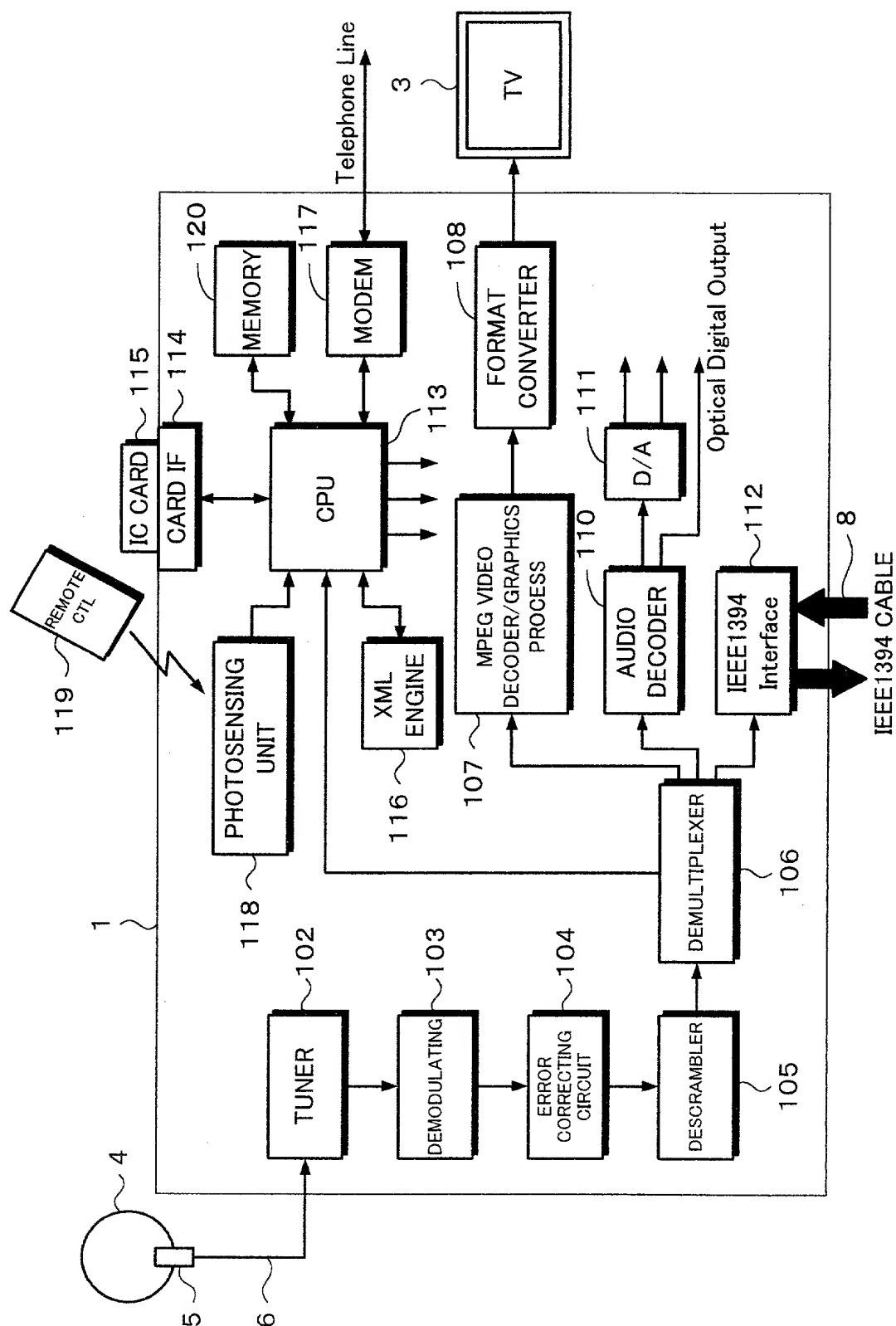


Fig. 3

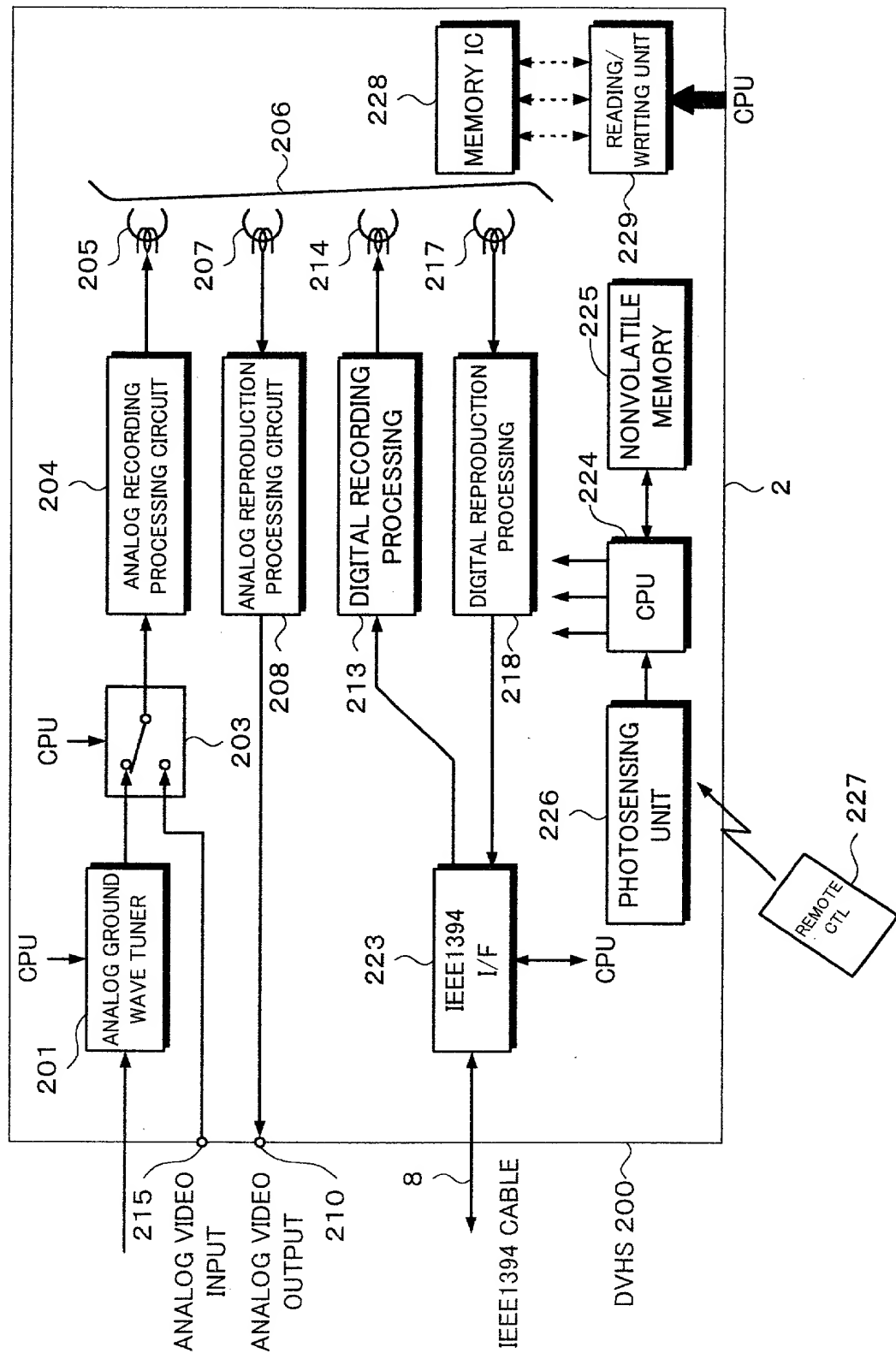




Fig. 4A

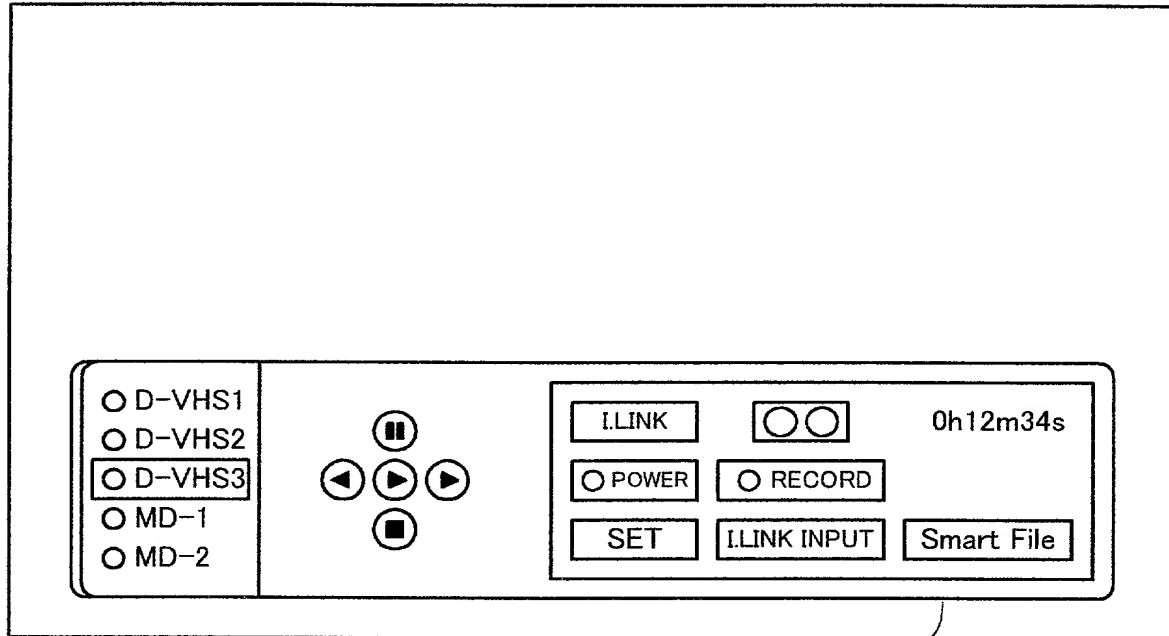
VCR STATUS		DISPLAY OF CONTROL PANEL				NON-DISPLAY OF CONTROL PANEL			
		IMAGE	AUDIO	STATION SELECT	ALARM DISPLAY	IMAGE	AUDIO	STATION SELECT	ALARM DISPLAY
IEEE1394	STOP	RECEIVED IMAGE	RECEIVED SOUND	○		RECEIVED IMAGE	RECEIVED SOUND	○	
	RECORDING PAUSE	RECEIVED IMAGE	RECEIVED SOUND	○		RECEIVED IMAGE	RECEIVED SOUND	○	
	RECORD	RECEIVED IMAGE	RECEIVED SOUND	x	○	RECEIVED IMAGE	RECEIVED SOUND	x	○
ANALOG	STOP	GRAY	NO SOUND	x	○	RECEIVED IMAGE	RECEIVED SOUND	○	
	RECORDING PAUSE	GRAY	NO SOUND	x	○	RECEIVED IMAGE	RECEIVED SOUND	○	
	RECORD	GRAY	NO SOUND	x	○	RECEIVED IMAGE	RECEIVED SOUND	○	

**Fig. 4B**

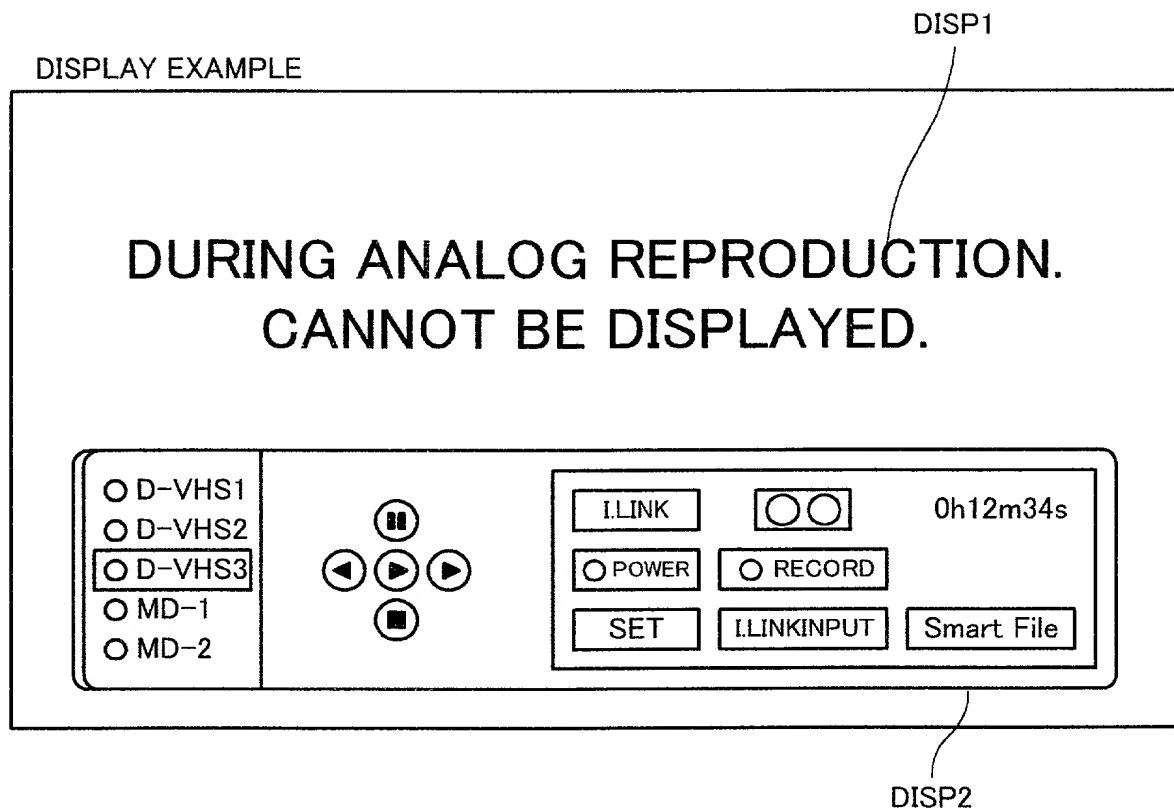
	DISPLAY OF CONTROL PANEL				NON-DISPLAY CONTROL PANEL			
	IMAGE	AUDIO	STATION SELECT	ALARM DISPLAY	IMAGE	AUDIO	STATION SELECT	ALARM DISPLAY
VCR STATUS								
DIGITAL	REPRODUCED IMAGE	REPRODUCED SOUND	x		REPRODUCED IMAGE	REPRODUCED SOUND	x	
ANALOG	GRAY	NO SOUND	x	O	GRAY	NO SOUND	x	O

**Fig. 5**

DISPLAY EXAMPLE



DISP2

*Fig. 6*

**Fig. 7**

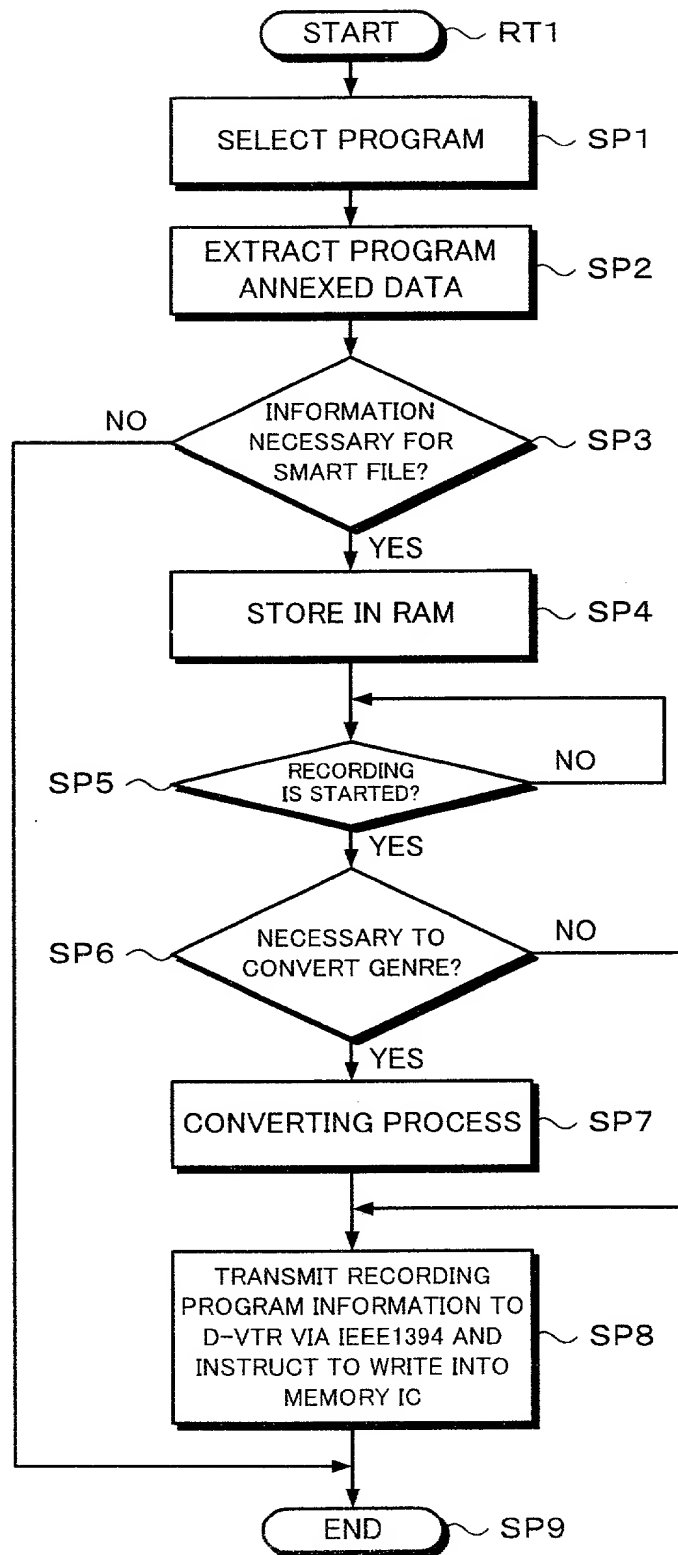


Fig. 8

DIGITAL VTR			MS		
MAIN CLASSIFICATION	FINE CLASSIFICATION	NAME OF GENRE TO BE DISPLAYED ON SMART FILE	MAIN CLASSIFICATION	FINE CLASSIFICATION	NAME OF GENRE FROM BROADCASTER
0X0	0X0	SPACIAL			
	0X1 to 0XF				
0X1	0X0	MOVIE	0X0 0X1	0X0 to 0XF 0X0 to 0XF	JAPANESE MOVIE FOREIGN MOVIE
	0X1 to 0XF				
0X2	0X0	NEWS	0X6	0X0 to 0XF	NEWS/REPORT
	0X1 to 0XF				
0X3	0X0	SHOW			
	0X1 to 0XF				
0X4	0X0	SPORTS	0X2 0X3	0X0 to 0XF 0X0 to 0XF	SPORTS 1 SPORTS 2
	0X1 to 0XF				
0X5	0X0	FOR CHILDREN	0X9	0X0 to 0X7	FOR CHILDREN/EDUCATION
	0X1	ANIMATION	0X9	0X0 0X1	JAPANESE ANIMATION/FOREIGN ANIMATION
	0X2 to 0XF				
0X6	0X0	MUSIC	0X4	0X0 to 0XF	MUSIC
	0X1 to 0XF				
0X7	0X0	ART/CALTURE	0XA	0X0 to 0XF	CULTURE/DOCUMENTARY
	0X1 to 0XF				
0X8	0X0	SERIES			
	0X1 to 0XF				
0X9	0X0	EDUCATION	0X9	0X8 to 0XF	FOR CHILDREN/EDUCATION
	0X1 to 0XF				
0XA	0X0	HOBBY	0X8	0X0 to 0XF	LEISURE/HOBBY
	0X1 to 0XF				
0XB	0X0 to 0XF				
0XC	0X0 to 0XF				
0XD	0X0	SHOPPING	0X7	0X1	SHOPPING(VARIETY)
	0X1 to 0XF				SHOPPING(OTHERS)
0XE	0X0	VARIETY	0X7	0X0 0X2 to 0XF	VARIETY
	0X1 to 0XF				
0XF	0X0				
	0X1	DRAMA	0X5	0X0 to 0XF	DRAMA
	0X2				
	0X3				
	0X4 to 0XF				
	0XE	OTHERS			OTHER THAN THE ABOVE
	0XF	<NOT DISPLAYED>			

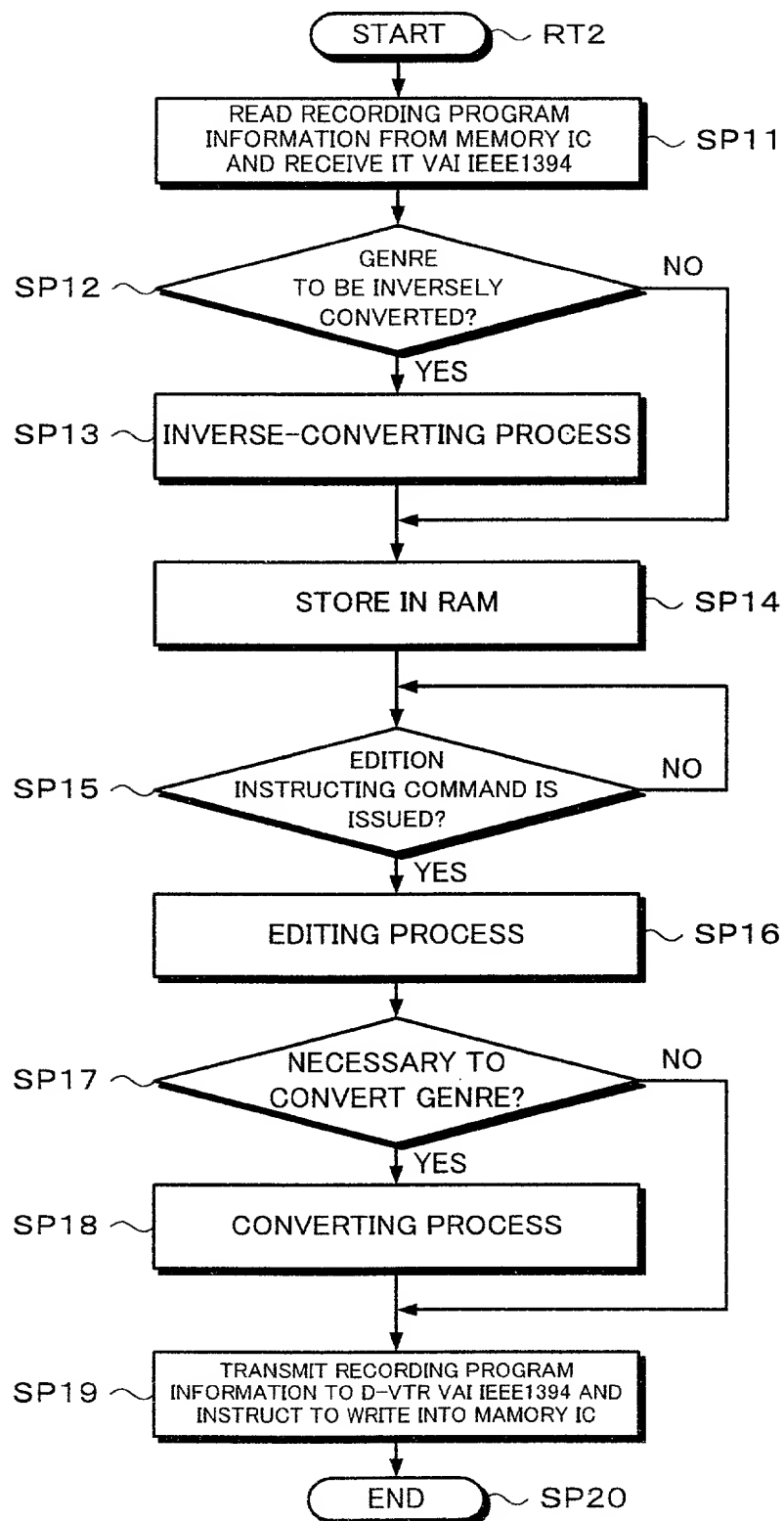
**Fig. 9**

Fig. 10

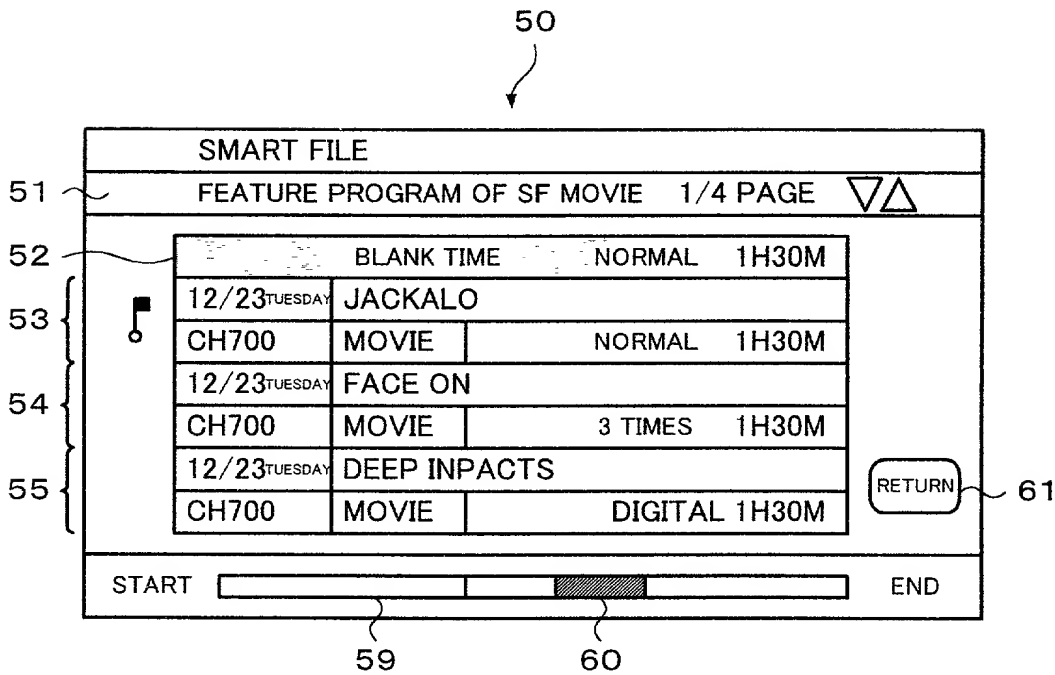
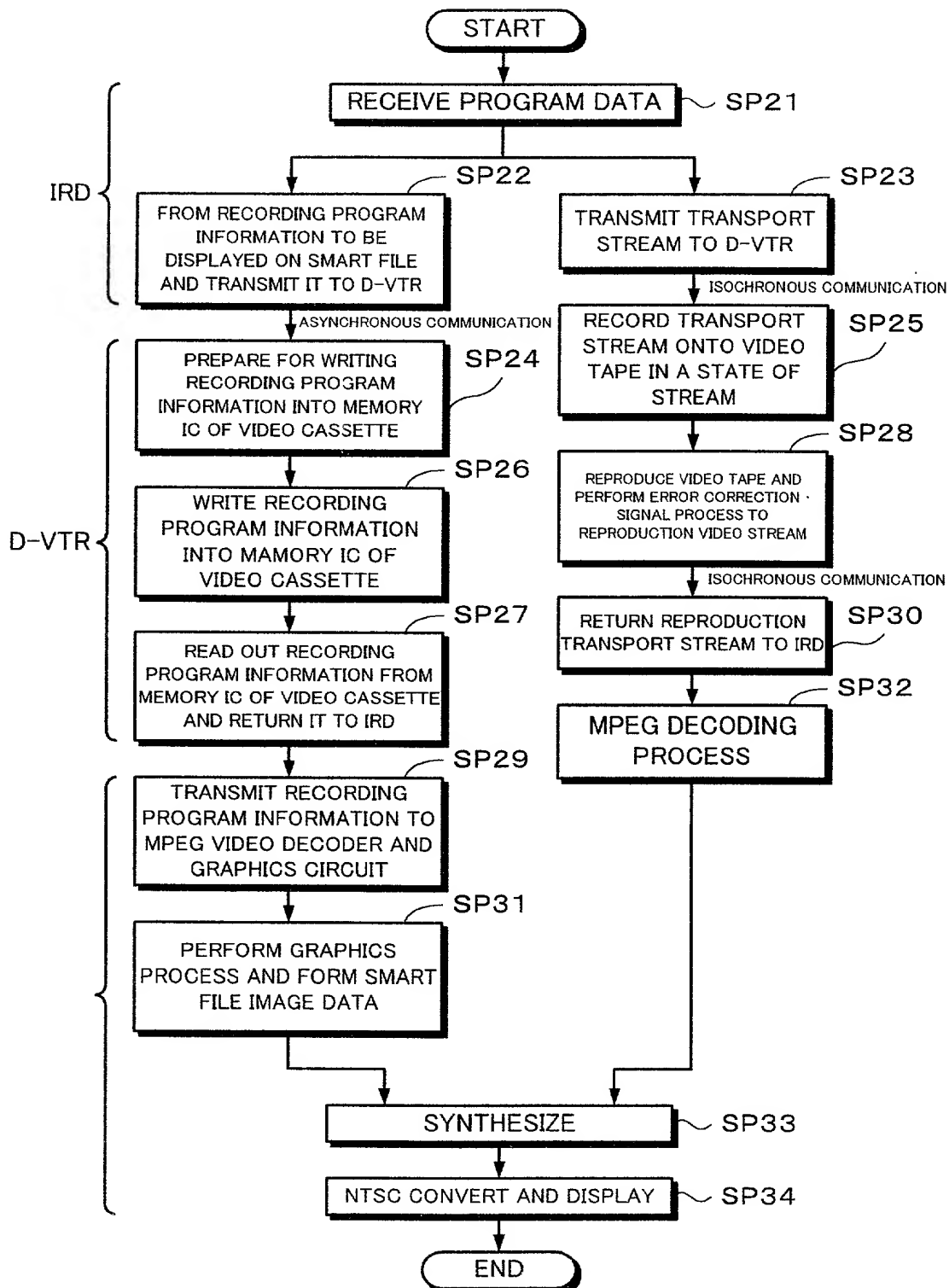




Fig. 11



- 1.. IRD
- 2.. DIGITAL VIDEO CASSETTE RECORDING/REPRODUCING APPARATUS
- 3.. TELEVISION RECEIVER
- 8.. IEEE1394 CABLE
- 107.. MPEG2 VIDEO DECODER
- 229.. DATA READING/WRITING UNIT
- 228.. MEMORY IC

# DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION

ATTORNEY'S DOCKET NO.: SONYJP 3.3-086

SONYJP REFERENCE: S99P1321US00

As a below-named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

## RECEIVING APPARATUS OF DIGITAL BROADCASTING AND DISPLAY METHOD OF RECORDING PROGRAM ASSOCIATED INFORMATION

the specification of which

☐ is attached hereto

☒ was filed on November 10, 1999 as United States Application Number or PCT International Application Number PCT/JP99/06242 and was amended on April 14, 2000 (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate or § 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed:

### **PRIOR FOREIGN APPLICATION(S)**

COUNTRY	APPLICATION NUMBER	DATE OF FILING (month, day, year)	PRIORITY CLAIMED
JAPAN	P10-322299	November 12, 1998	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
JAPAN	P10-333255	November 24, 1998	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
			YES <input type="checkbox"/> NO <input type="checkbox"/>

LISTING OF FOREIGN APPLICATIONS CONTINUED ON PAGE 3 HEREOF ☐ YES ☒ NO

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

Application Number:

Filing Date:

Application Number:

Filing Date:

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s), or § 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

U.S. Parent Application Serial Number:

Parent Filing Date:

Parent Patent No.:

U.S. Parent Application Serial Number:

Parent Filing Date:

Parent Patent No.:

PCT Parent Number:

Parent Filing Date:

LISTING OF US APPLICATIONS CONTINUED ON PAGE 3 HEREOF: ☐ YES ☒ NO

**POWER OF ATTORNEY:** As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

Lawrence I. Lerner, Reg. No. 19,516, Sidney David, Reg. No. 22,768, Joseph S. Littenberg, Reg. No. 20,832; Arnold H. Krumholz, Reg. No. 25,428, William L. Mentlik, Reg. No. 27,108, John R. Nelson, Reg. No. 26,573, Roy H. Wepner, Reg. No. 28,350, Stephen B. Goldman, Reg. No. 28,512; Paul H. Kochanski, Reg. No. 29,660, Marcus J. Millet, Reg. No. 28,241, Bruce H. Sales, Reg. No. 32,793, Daniel H. Bobis, Reg. No. 16,694, Keith E. Gilman, Reg. No. 32,137, Robert B. Cohen, Reg. No. 32,768, Arnold B. Dompier, Reg. No. 29,736, Michael H. Teschner, Reg. No. 32,862, Gregory S. Gewirtz, Reg. No. 36,522; Jonathan A. David, Reg. No. 36,494, Shawn P. Foley, Reg. No. 33,071, Thomas M. Palisi, Reg. No. 36,629, John P. Maldjian, Reg. No. 41,967, Kimberly V. Flugger, Reg. No. 43,612, Jason I. Garbell, Reg. No. 44,116, Renee M. Robeson, Reg. No. 41,777, Raymond W. Augustin, Reg. No. 28,588, Harvey L. Cohen, Reg. No. 28,365, Michael J. Wallace, Jr., Reg. No. P-44,486, Michael J. Doherty, Reg. No. 40,592, Robert J. Scheffel, Reg. No. 43,090.

### **SEND CORRESPONDENCE TO:**

LERNER, DAVID, LITTENBERG,  
KRUMHOLZ & MENTLIK, LLP  
600 South Avenue West  
Westfield, New Jersey 07090

### **DIRECT TELEPHONE CALLS TO:**

(name and telephone number)

ROBERT B. COHEN

(908) 654-5000 Fax: (908) 654-7866

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1-00 Full name of sole or first inventor (given name, family name): HAJIME INOUE

Inventor's signature *Hajime Inoue* Date June 23, 2000

Residence: Chiba, Japan Citizenship: Japan JPX

Post Office Address: c/o Sony Corporation, 7-35, Kitashinagawa 6-chome, Shinagawa-ku, Tokyo, Japan

2-00 Full name of second joint inventor, if any (given name, family name): TATSUYA WAKAHARA

Second Inventor's signature *Tatsuya Wakahara* Date Jun 16, 2000

Residence: Tokyo, Japan Citizenship: Japan JPX

Post Office Address: c/o Sony Corporation, 7-35, Kitashinagawa 6-chome, Shinagawa-ku, Tokyo, Japan

3-00 Full name of third joint inventor, if any (given name, family name): NAOKI MURAYAMA

Third Inventor's signature *Naoki Murayama* Date Jun 16, 2000

Residence: Tokyo, Japan Citizenship: Japan JPX

Post Office Address: c/o Sony Corporation, 7-35, Kitashinagawa 6-chome, Shinagawa-ku, Tokyo, Japan

4-00 Full name of fourth joint inventor, if any (given name, family name): MASAO MIZUTANI

Fourth Inventor's signature *Masao Mizutani* Date June 19, 2000

Residence: Kanagawa, Japan Citizenship: Japan JPX

Post Office Address: c/o Sony Corporation, 7-35, Kitashinagawa 6-chome, Shinagawa-ku, Tokyo, Japan

5-00 Full name of fifth joint inventor (given name, family name): YASUAKI OHTA

Fifth Inventor's signature *Yasuaki Ohta* Date Jun 16, 2000

Residence: Aichi, Japan Citizenship: Japan JPX

Post Office Address: c/o Sony Ichinomiya Corporation, 6 Takada-Ikejiri, Ichinomiya-shi, Aichi-ken, Japan

Full name of sixth joint inventor, if any (given name, family name):

Sixth Inventor's signature \_\_\_\_\_ Date \_\_\_\_\_

Residence: \_\_\_\_\_ Citizenship: \_\_\_\_\_

Post Office Address: \_\_\_\_\_

Full name of seventh joint inventor, if any (given name, family name):

Seventh Inventor's signature \_\_\_\_\_ Date \_\_\_\_\_

Residence: \_\_\_\_\_ Citizenship: \_\_\_\_\_

Post Office Address: \_\_\_\_\_

Full name of eighth joint inventor, if any (given name, family name):

Eighth Inventor's signature \_\_\_\_\_ Date \_\_\_\_\_

Residence: \_\_\_\_\_ Citizenship: \_\_\_\_\_

Post Office Address: \_\_\_\_\_

☐ Additional inventors are being named on separately numbered sheets attached hereto.

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